DOCUMENT RESUME

ED 380 597 CE 068 497

TITLE	Photography. Technology Learning Activity. Teacher Edition. Technology Education Series.
INSTITUTION	Oklahoma State Dept. of Vocational and Technical Education, Stillwater. Curriculum and Instructional Materials Center.
PUB DATE	91
NOTE	158p.
AVAILABLE FROM	Curriculum and Instructional Materials Center, Oklahoma Dept. of Vocational and Technical Education, 1500 West Seventh Avenue, Stillwater, OK 74074 (instructional package, one teacher and one student edition, order no. TE2130: $35; student edition, TE3130: $13).
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Behavioral Objectives; Films; Instructional Materials; Integrated Curriculum; Intermediate Grades; Learning Activities; Learning Modules; *Photographs; *Photography; Pretests Posttests; Production Techniques; Secondary Education; State Curriculum Guides; Student Evaluation; Teaching Methods; *Technology Education

ABSTRACT

This curriculum guide provides technology learning activities designed to prepare students in grades 6-10 to work in the world of the future. The 8-day course provides exploratory, hands-on learning activities and information that can enhance the education of students of all types in an integrated curriculum that provides practical applications of academic skills. The guide contains both instructor and student sections. The instructor's section includes the following: background information; expected learner outcomes; suggested activities; suggested resources; instructional sequence; equipment, tools, and supplies worksheet; pretest and posttest with answers; and an evaluation summary. Components of the student section are as follows: an introduction; summary of activities; pretest and posttest instructions; assignments; goal; glossary; expected learner outcomes; objectives; related Technology Student Association events; academic and workplace applications; impact statements; career information; and an optional activity that could be used for solving problems or reinforcing learning. Topics are as follows: the history of photography, parts of a camera, using the camera, photo composition, care and storage of photographic materials, tools and materials, rolling film onto a film reel, developing film, printing a contact sheet, and printing photographs. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 380 597

Technology Learning Activity

Technology Education Series

PHOTOGRAPHY

TLA TE-1130

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
● Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY
B Frazier
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

UNITED STATES OF AMERICA

BEST COPY AVAILABLE

CE068497

CIMC

Teacher Edition

Oklahoma Department of
Vocational and Technical Education
1500 West Seventh Avenue
Stillwater, OK 74074-4364

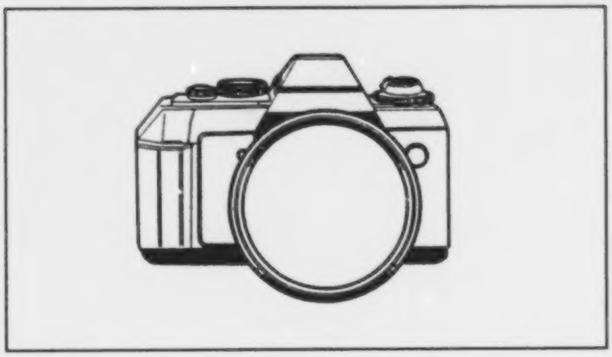
TECHNOLOGY EDUCATION

TECHNOLOGY LEARNING ACTIVITY

TE1130

PHOTOGRAPHY

Suggested Time: 8 Days



Developed by the
Curriculum and Instructional Materials Center
for the Technology Education Division
Oklahoma Department of Vocational and Technical Education

92-009267

©
Copyright 1991

Oklahoma Department of
Vocational and Technical Education
Curriculum and Instructional Materials Center

All rights reserved.

Printed in the United States of America by the
Oklahoma Department of Vocational and Technical Education
Stillwater, Oklahoma 74074-4364

This publication, or parts thereof, may not be reproduced in any form by photographic, electrostatic, mechanical, or other methods, for any use including information storage and retrieval, without written permission from the publisher.

Use of commercial products in these instructional materials does not imply endorsement by the Oklahoma Department of Vocational and Technical Education.

The Oklahoma Department of Vocational and Technical Education does not discriminate on the basis of race, creed, color, national origin, sex, age, veteran status, or qualified handicap.

Cover photo courtesy NASA

TABLE OF CONTENTS

FOREWORD 4
PREFACE 5
ACKNOWLEDGEMENTS 6

TECHNOLOGY EDUCATION OVERVIEW

About the Program 8
About the TLAs 10
About Ordering TLAs 12
Corrections and Suggestions 14

USING THIS PUBLICATION: INSTRUCTOR'S SECTION

Background Information 15
Expected Learner Outcomes 15
Suggested Activities 17
Suggested Resources 18
Instructional Sequence 18
Equipment, Tools, and Supplies Summary Worksheet 18
Pretest and Posttest 19
Test Answers 19
Evaluation Summary 19

USING THIS PUBLICATION: STUDENT'S SECTION

Introduction 20
Summary of Activities for the Day 20
Pretest Instructions 21
Assignments to Turn In 21
Goal 21
Words You Should Know 21
Expected Learner Outcomes 22
Objectives 22
Related TSA Competitive Events 22
Academic and Workplace Applications 23
Impact Statements 29
Career Search 30
Posttest Instructions 30
Skunk Works 31

HAZARD ALERT MESSAGES 32

INSTRUCTOR'S SECTION 35

STUDENT'S SECTION

FOREWORD

What will be the careers of the future? The workforce of tomorrow will be shaped by the technologies being developed today. Students today need accurate, interesting information on growing technologies in order to make informed decisions about their futures.

It is our hope that this curriculum will help improve the quality of career decisions for our students. Students are introduced to a wide range of current, "cutting-edge" technologies and are encouraged to think critically about how those technologies influence their lives and futures. Today's students do not have to become the victims of "technological illiteracy," but instead can learn to anticipate technological developments and take positive steps to prepare for the future.

Technology Learning Activities provide students with the knowledge and an introduction to the skills they need for a positive learning and career experience. Every generation is faced with learning how to manage technological advances. Information gained through participation in the *Technology Education* program can help students develop a holistic view of technology on which to base their educational and career decisions.

Roy Peters, Jr., Ed.D., State Director
Oklahoma Department of
Vocational and Technical Education

Roger Stacy, Ed.D., State Supervisor
Technology Education
Oklahoma Department of
Vocational and Technical Education

PREFACE

We believe that one of the most effective ways to improve education is through the development and implementation of a sound instructional materials system. Technology Education instructional materials represent a new design for CIMC which recognizes the importance of graphic materials in the learning process.

Technology Education instructional materials are designed for 6th through 10th grade students. The design of these materials is based on current research on how people read and gain information from documents. The design is called "New Look" and integrates both graphics and text into a balanced presentation which is easy to use and follow.

Technology Education provides the student a look at what the world will be like in the future based on technologies in use and being developed today. Throughout the Technology Education instructional materials, the students are introduced to "cutting-edge" technologies that they will use and encounter in a working environment later in life. This exposure gives them a wide range of experiences on which to base career decisions.

This publication is intended as a starting point, from which the teacher can innovate, localize, and personalize in order to prepare students for their future. The *Technology Education* series of Technology Learning Activities was written with the realization that we are creating the workforce of tomorrow by how and what we teach about technology today.

Sherry Wietelman, Curriculum Development Specialist
Curriculum and Instructional Materials Center
Oklahoma Department of
Vocational and Technical Education

Charles F. Kemnitz, President
Atlatl Communications, Inc.

ACKNOWLEDGEMENTS

The Curriculum and Instructional Materials Center (CIMC) extends its appreciation to those individuals who played important roles in the development of Technology Learning Activity materials.

Generous thanks is extended to Lynn Hawkins and Jim Harder, both Technology Education teachers at Mayfield Junior High School, for the time, talent and knowledge they contributed in determining the content of this Technology Learning Activity (TLA). We also extend our thanks to them for writing the pilot TLA upon which this TLA was based.

Thank you is also extended to the vocational educators who helped with field testing and contributed their expert input on individualized vocational instructional methods.

Alan Fillmore
Meeker High School

Jerry Lewis
Atoka High School

Ron Givens
Tulsa-Nimitz Middle School

We also thank the State Director, Dr. Roy Peters, Jr., and the Assistant State Director, Dr. Charles O. Hopkins, for their continued support throughout this project.

The school administrators who supported instructor participation in this project and/or allowed their facilities to be used as field test sites in this project deserve a special thank you, as well.

Chris Gillespie
Atoka High School

Brent Walden
Meeker High School

Marolyn Hunnicutt
Tulsa-Nimitz Middle School

Joe Shirley
Mayfield Junior High School

Oklahoma Department of Vocational and Technical Education Technology Education staff who provided leadership and direction on this project also deserve special recognition.

Roger Stacy, Ed.D.
State Supervisor
Technology Education

Donovan Bowers
Assistant State Supervisor
Technology Education

Harold Holley
Assistant State Supervisor
Technology Education

Special Recognition and gratitude is expressed to Dr. Charles F. Kemnitz who trained and coordinated the efforts of a team of technical writers on this project. His professionalism, dedication and commitment to quality instructional materials allowed us to design learning activities that students can readily use to explore new and existing technologies.

Only through the close cooperation of the Curriculum and Instructional Materials Center staff was this curriculum developed. Sincere thanks are shared with the CIMC coordinators.

Brenda Stacy, Ed.D.
CIMC Coordinator

Lynna Ausburn, Ph.D.
CIMC Development Coordinator

Special recognition and thanks are also extended to other individuals within the Oklahoma Department of Vocational and Technical Education (ODVTE) involved in the development and distribution process: Noel Wilcoxson, Duane "Frosty" Foster and Diane Ensign and their staffs at the ODVTE Print Shop; Bob Davis and staff artist Kathryn Moore for the cover design; Darrel Stiles and his staff in the ODVTE Warehouse for packaging and coordinating transportation and distribution of these materials; and Rose Primeaux and her staff in Word Processing.

Finally, a big thank you to all ODVTE team members who offer their support on a daily basis in "behind-the-scenes" ways but never seem to be recognized for their contributions: Suzanne Perry and Terri Thomson, CIMC secretaries; Karen Heppel and Shirley Hill, Technology Education secretaries.

Sherry Wietelman
Curriculum Development Specialist
Curriculum and Instructional Materials Center
Oklahoma Department of Vocational and Technical Education

TECHNOLOGY EDUCATION OVERVIEW

About the Program

Because the American culture is distinctly characterized as technological, it becomes the function of our schools to give every student an insight into and an understanding of the technological nature of the culture. Technology Education strives to perform this function.

Technology Education in Oklahoma is an instructional program that provides young men and women (grades 6 - 10) with daily, hands-on exploratory experiences and insights into technology and career opportunities so that they can make meaningful occupational and educational choices. It is a program which can enhance the educational experience of all students, whether they are the valedictorian/honor-type student, the middle range/average student, or the student who has found little success in school, namely the at-risk student.

Technology Education acquaints all students with their technological environment so they can make rational decisions about their own lives on a day-to-day basis and participate in controlling their own destiny. The program directs students to related technological and industrial fields, enabling students to realize their full potential and make maximum use of their individual talents in fulfilling career goals in their selected areas of employment.

Technology education capitalizes on the individual's potential for reasoning and problem solving, for imagining and creating, and for constructing and expressing through the use of tools and materials related to technology. It develops content and

TECHNOLOGY EDUCATION OVERVIEW

experiences to contribute to the growth and development of students commensurate with their potential. Thus, Technology Education is a basic and fundamental study for all persons in regard to career explorations and educational opportunities.

Opportunities to develop and apply leadership, social, civic, and technologically related skills are provided through the Technology Student Association (TSA). TSA is the appropriate vocational student organization identified as a teaching tool for teachers to use in assisting students to achieve identified course competencies. Competency-based activities are an integral part of the instructional program.

All Technology Education courses are taught in a one-period block of time (45-55 minutes), with each of the four Technology systems (communication, construction, manufacturing, and transportation, energy and power) being designed to provide a means through which other courses such as math, science, English, and social studies can be applied in a practical manner within a technology-based situation. Teaching across the curriculum is vital to the success of a Technology Education program.

TECHNOLOGY EDUCATION OVERVIEW

About the TLAs

The *Technology Education* series consists of 40 Technology Learning Activities (TLAs) for instruction and a supplemental activities book. Each TLA is divided into two parts: an instructor's guide and a student guide. The instructor's guide provides an overview of Technology Education, a summary of activities and supplies needed for students to complete the Technology Learning Activity, a supplies and materials worksheet for the instructor, an overview of the particular TLA, written exam answer sheets, and evaluation summary for the TLA.

Master copies of the evaluation summary sheets, pretest and posttest, and supplies and materials worksheets are provided with this instructors edition of the TLA. These sheets may be reproduced for classroom use.

All of the TLAs focus on measurable and observable learning outcomes. Instructors are encouraged to supplement, personalize, localize, and motivate with these materials in order to develop a complete teaching/learning process.

TLAs are designed for use in more than one class period of instruction. Careful study of each TLA by the instructor will help her or him determine the following:

- ⋙ Skills to demonstrate
- ⋙ Supplies and equipment needed

TECHNOLOGY EDUCATION OVERVIEW

- Amount of time needed for student practice111
- Workstation Bookshelf, Instructors Reference Materials, and a bibliography are provided for supplemental resources
- Supplementary materials, including print and non-print media to order
- Resource people to contact
- Facility modifications which may be necessary to administer the TLA

Each TLA is based on performance objectives. Performance objectives are specific, stating the performances necessary to meet the goal of the TLA.

The overall goal of the unit tells what the student should be able to do and what standard will be used to determine whether the student has achieved competency. The specific objectives outline the sequence of the competencies required to meet the TLA goal. The competencies may be either cognitive, requiring knowledge only, or psychomotor, requiring knowledge and skill.

TECHNOLOGY EDUCATION OVERVIEW

About Ordering TLAs

Additional TLAs in the *Technology Education* series may be ordered through the Oklahoma State Department of Vocational and Technical Education, Curriculum and Instructional Materials Center, 1500 West Seventh Avenue, Stillwater, OK 74074-4364. Phone 1-800-522-5810.

NOTE: The 1100- and 1200-series numbers given on the next page are for ordering TLA Instructor's Editions; to order Student Editions, change the first two numbers to 31 (for 8-Day TLAs) or 32 (for 6-Week TLAs).

TECHNOLOGY EDUCATION OVERVIEW

TLA Title	Order No.
8-DAY TLAs	
Aerospace and Flight	TE1117
Agricultural Education	TE1123
Audiovisual Programming	TE1131
CAD — Autocad Release 10	TE1114
Career Search	TE1104
Drafting	TE1134
Electricity — Principles and Applications	TE1105
Electronic Publishing	TE1135
Electronics (CES)	TE1106
Fluidics Technology	TE1116
Health Occupations	TE1124
Home Economics	TE1125
Introduction to VoTech	TE1122
Introduction to Animation	TE1132
Keyboarding and Computer Application	TE1115
Laser/Fiber Optics/Holography	TE1129
Lasers Technology	TE1103
Marketing Education	TE1126
Material Processes — Plastics	TE1133
NASA Aerospace-Spacelink	TE1111
Photography	TE1130
Problem Solving	TE1110
Research and Design	TE1101
Residential Construction	TE1121
Robotics — Control Technology	TE1112
Robotics — ProArm	TE1113
Safety (Design Briefs)	TE1107
Structural Engineering	TE1102
Synergetic Technology	TE1120
Technical Report Writing	TE1118
Technology Challenge	TE1109
Thermal Screen Printing	TE1119
Trade and Industrial Education	TE1127
TSA Leadership	TE1108
Vocational Business	TE1128
6-WEEK TLAs	
Animator	TE1203
CAD/Board Drafting	TE1201
Control Technology	TE1202
Electronics/Electricity/Robotics	TE1204
Electronic Publisher	TE1205

TECHNOLOGY EDUCATION OVERVIEW

Corrections and Suggestions

CIMC wants to provide Technology Education instructors and students materials that are accurate and effective. Although the CIMC strives to maintain the highest standards of development and production, oversights occasionally do occur. If you find any errors in this or other CIMC publications or have suggestions for improving their usefulness, please notify the CIMC staff. One easy way of pointing out errors is to make a photocopy of the affected page and indicate the correction on the copy. Mail this information to the CIMC, where it will be used to correct the publication before the materials are reprinted.

To ensure that the material is updated on a timely basis, notify the CIMC of necessary corrections as soon as possible. Do not assume that someone else will notice the error and inform the CIMC; other users may be making the same assumption. Please send corrections and recommendations for improving this publication to the following address:

Curriculum Development Coordinator
Curriculum and Instructional Materials Center
Oklahoma Department of Vocational and
Technical Education
1500 West Seventh Avenue
Stillwater, Oklahoma 74074-4364

USING THIS PUBLICATION

INSTRUCTOR'S SECTION

Background Information

The background information component provides instructors with basic information about the subject of the TLA. Instructors are encouraged to use suggested resources for additional information on the specific technology used in each TLA.

Expected Learner Outcomes

There are 19 Expected Learner Outcomes for the *Technology Education* series. Not every TLA fulfills all 19 Expected Learner Outcomes, so outcomes specific to each TLA are listed in the Instructors Section and in the Students Section. The 19 Expected Learner Outcomes for the *Technology Education* series are:

- The student will know and appreciate the importance of technology and technological literacy.
- The student will explore career opportunities so they can make meaningful occupational choices.
- The student will explore future educational opportunities so they can make meaningful educational choices.
- The student will apply problem solving and critical thinking techniques.
- The student will apply math, science, reading, and other school subjects in a practical situation.
- The student will develop keyboarding and computer literacy skills.

USING THIS PUBLICATION

INSTRUCTOR'S SECTION

- The student will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- The student will recognize and develop individual talents.
- The student will think logically and sequentially.
- The student will develop leadership, creative abilities, positive self-concepts, and individual potential in a technological society.
- The student will become a more sophisticated consumer of the goods and services of a technological society.
- The student will adjust to a changing technological environment.
- The student will develop an understanding and the ability to adapt to those technological forces that influence life in the 21st Century.
- The student will develop an understanding of economic development.
- The student will communicate by making clear and relevant points through the development of mental process skills.

- The student will apply design, imagination, and creative abilities.
- The student will learn applications of lifelong learning skills.
- The student will think globally and act locally.
- The student will explore the organization and management systems of business and industry.

Suggested Activities

The suggested activities component is to assist during the preparation stage of the teaching/learning process. The activities provide suggestions for preparation and evaluation during the instructional process. The instructor should read the suggested activities before assigning the TLAs to allow time to obtain supplemental materials, prepare audiovisual materials, and contact outside resource persons. Duties of the instructor will vary according to the particular TLA.

USING THIS PUBLICATION

INSTRUCTOR'S SECTION

Suggested Resources

Suggested resources, include people, and print and non-print media that may be used with the TLA. References used during the development of each TLA are also provided. The instructor can use suggested resources and TLA references to supplement her or his knowledge of the subject to help students with particular interests or objectives in the area covered. Please note that suggested resources and references listed in this publication existed when this publication was written. CIMC assumes no responsibility for providing these materials and cannot ensure the availability of these materials as individual vendors, manufacturers, and publishers may discontinue these products at any time.

Instructional Sequence

This component provides instructors with daily lesson plans for the TLA. Included in the instructional sequence component are suggested daily assignments and equipment, tools, and supplies that will be needed for each student. A column for facility requirements or modifications is provided for each instructor. This component is provided as a guide to plan for and monitor students' progress through the TLA.

Equipment, Tools, and Supplies: Summary Worksheet

This component is provided as a planning tool for instructors. It provides instructors with a list of the necessary equipment, tools and supplies to support student activities and provides specific information for budgeting purposes.

USING THIS PUBLICATION

INSTRUCTOR'S SECTION

Pretest and Posttest	These components provide criterion-referenced evaluation of the objectives listed in each TLA. If objectives or activities have been added, deleted, or modified, appropriate changes should be made on the tests.
Test Answers	This component is provided to assist instructors in evaluating student performance on written tests.
Evaluation Summary	This component is provided to assist instructors in summarizing the performance of each student on an individual basis. The evaluation summary forms are also provided as photocopy masters for the instructors use.

USING THIS PUBLICATION

STUDENT'S SECTION

Introduction

Daily activities are the step-by-step procedures students will follow to complete the learning experience. Each TLA is organized by daily tasks and activities. Students are able to pace their progress through the TLA by referring to the activities for the day.

Within the daily activity pages are components common to all TLAs.

Summary of Activities

A Summary of Activities page begins each day of the TLA. This page provides several important pieces of information for both the student and instructor.

❶ In the left column this page provides the student with a list of activities to be accomplished that day.

❷ In the right column the major Academic and Workplace Application which applies to that day's activities is graphically indicated with a standard icon.

❸ Below the icon is a list of specific skills reinforced during that day's activities.

USING THIS PUBLICATION	STUDENT'S SECTION
Pretest Instructions	The students are required to take a Pretest as one of the first day's activities. The instructions for the Pretest are given in this section.
Assignments to Turn In	Day One includes a list of all assignments the students are expected to turn in during or at completion of the TLA. This list includes all tests, activities, and products covered in the TLA.
Goal	On Day One, following the assignments checklist, is a concise statement of the overall goal of the TLA. This statement summarizes the purpose for completing the TLA and encourages the student to think about the broader implications of the learning experience.
Words You Should Know	The first day's activities includes a glossary of unfamiliar technical terms used in the TLA. Often these terms are necessary for the student in order to accurately follow instructions in the activity procedures. The students should be encouraged to review this glossary and refer to it often during the course of the TLA.

USING THIS PUBLICATION

STUDENT'S SECTION

Expected Learner Outcomes Reinforced by this TLA

As stated in the guide to the Instructors Section, there are 19 identified Expected Learner Outcomes associated with the *Technology Education* series. This section of Day One activities lists the Expected Learner Outcomes that specifically apply to the TLA. A student who reviews this list will gain a better understanding of the scope of experiences and skills to be gained from the TLA.

Objectives

Each TLA is made up of a set of measurable objectives. In this section on Day One, students are given a list of all the objectives addressed in the TLA. This list can serve to introduce students to the "flow" of the TLA as they build introductory skills in a technology.

Related TSA Competitive Event(s)

Each TLA may be used by students to begin work toward completion of a Technology Student Association competitive event. Some TLAs are tied to a specific TSA event; other TLAs may be used with several events. This Day One section gives the student and instructor a list of appropriate TSA events which the TLA may support.

TSA competitive events promote leadership development, and an understanding that winning isn't everything but involvement is. Events are staged at Local, Regional, State, and National levels through which the student may progress.

USING THIS PUBLICATION

STUDENT'S SECTION

Academic and Workplace Applications

The curricular content and activities found in this Technology Learning Activity help students apply academic and workplace competencies. These competencies include: Reading Skills, Writing Skills, Mathematics Skills, Science Skills, Oral Communications Skills, Interpersonal or Relating Skills, Creative Thinking and Problem Solving Skills, Employability Skills, and Social Studies Skills.

Preparing students to enter successfully into today's world ...

Preparing students to enter successfully into today's world of work offers vocational education a substantial challenge. The contemporary workplace is characterized by constant and rapid technological change and by increasing job complexity and skill intensity. Due to rapid technological advancement, the half-life of work skills is now reduced to a bare three to five years. Out of this new workplace environment has arisen a growing national awareness of the critical importance of an American workforce armed with the skills necessary to survive in a competitive economy.

... emergence of a renewed emphasis on basic academic skills ...

One result of this national awareness has been the emergence of a renewed emphasis on basic academic skills in all areas of education. Pressure to increase academic skill development is being placed on education by both legislative action and industry mandate. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 sets stringent academic and workplace skill requirements for vocational education. State legislatures are increasingly requiring basic skills accountability by teachers and school administrators.

USING THIS PUBLICATION

STUDENT'S SECTION

... expected learner outcomes are being implemented with increasing frequency.

Graduation exams, minimum competency requirements, and expected learner outcomes are being implemented with increasing frequency. In addition, business and industry are delivering the message clearly to educators that vocational competence now requires increased strength in academic and workplace skills.

The issue of basic skills ... was successfully addressed in a national three-year study ...

The issue of the basic skills currently required in the work place was very successfully addressed in a national three-year study conducted jointly by the American Society of Training and Development (ASTD) and the U.S. Department of Labor (DOL). The findings of this study were published in 1990 in the book, *Workplace Basics: The Essential Skills Employers Want.*

... research indicates clearly that American employers ... need a variety of skills ...

The ASTD/DOL research indicates clearly that American employers have discovered that their workforces need a variety of skills that include, but are not limited to, the classic academic trio of reading, writing, and computation. Employers now are also looking for competence in areas such as "learning to learn," problem solving and critical thinking, interpersonal and teamwork skills, oral communication and listening techniques, and the social and personal management skills that demonstrate a capacity for independence and responsibility in on-the-job performance.

USING THIS PUBLICATION

STUDENT'S SECTION

... business and industry have expanded and re-defined "workplace basics."

It is clear that the requirements of today's business and industry have expanded and re-defined "workplace basics." It is in line with this re-definition, and with the competency requirements of current education legislation, that the Oklahoma Department of Vocational and Technical Education has chosen to address "basic skills" in the instructional materials produced by its Curriculum and Instructional Materials Center.

CIMC materials contain information and activities which develop academic and workplace application competencies ...

It is not a new development for CIMC materials to contain information and activities which develop academic and workplace application competencies in students undertaking vocational programs. What is new is the specific marking, or flagging, of items in our instructional materials that address academic and workplace application skills.

To assist teachers and students in identifying activities which promote academic and workplace skills ...

To assist teachers and students in identifying activities which promote academic and workplace skills development, CIMC has implemented a marking system which uses simple graphic symbols, or icons. These icons are located in the right margins of Activity Sheets. The following is an explanation of the icons and the kinds of academic and workplace application activities they indicate.

USING THIS PUBLICATION

READING SKILLS: Skills involving use of print resource material for obtaining and applying information.

WRITING SKILLS: Skills involving written communication of processes, information, or ideas.

MATHEMATICS SKILLS: Skills involving computation, calculation, and interpretation of numerical data.

STUDENT'S SECTION

Current vocational education literature indicates that functional literacy as a workplace basic needs to be defined in terms of reading competencies actually required for job performance. The activities identified with this icon as addressing reading skills in CIMC materials deal specifically with developing reading skills in an applied, job-related context. These range from general information-gathering activities to tasks requiring use of specific technical reference materials. Many contain a "learning to learn" aspect, which promotes engaging actively and purposefully in vocationally relevant enquiry.

Tasks identified with this icon promote development of skills in written communications. As with reading skills, the writing skills emphasized in CIMC materials have a vocational context. They include filling out forms, keeping work activity records, writing simple memos and letters, generating more complex reports and articles, and written expression of ideas and concepts related to vocational performance or exploration.

This icon identifies activities which develop vocationally-related skills in computation, measurement and estimation, selection and application of appropriate mathematical processes, and collecting, displaying, or interpreting data.

USING THIS PUBLICATION	STUDENT'S SECTION
SCIENCE SKILLS: Skills involving mastery and application of scientific information or theory.	This icon marks activities which are related to the development of skills in either the physical or biological sciences. These skills stress occupationally-related applications of science and technology.
ORAL COMMUNICATION SKILLS: Skills involving speaking and listening.	Activities marked with this icon promote development of effective speaking and listening. They include practice in such areas as speaking techniques, word choice, non-verbal messages, use of communication media, and using active listening techniques. Many of these activities promote "learning to learn" skills in verbal enquiry.
INTER-PERSONAL OR RELATING SKILLS: Skills involving working and getting along with others.	Activities which deal directly with skills in relating to others are marked with this icon. This includes areas such as multi-cultural awareness, group processes and dynamics, negotiation, dealing with conflict, cooperation and teamwork, values and attitudes, and leadership and motivation.

USING THIS PUBLICATION

STUDENT'S SECTION

CREATIVE THINKING AND PROBLEM SOLVING SKILLS: Skills involving comprehending, applying, analyzing, and developing complex ideas and situations.	This icon identifies activities which stress development of higher-order thought processes such as problem identification and analysis, lateral thinking, evaluating alternatives, developing solutions, examining assumptions, and evaluating outcomes.
EMPLOYABILITY SKILLS: Skills involving choosing, obtaining, and succeeding in a career.	Activities marked with this icon relate to competencies required to obtain employment and develop a career. These competencies include specific occupational tasks. They also include items such as career analysis and selection, job searching, completing applications and resumes, interviewing, and business etiquette and personal management skills required for job-keeping and maturing in one's work. Examples of the latter category include personal presentation, self-discipline, work accuracy, reliability, discretion, punctuality, stress handling, judgement, confidence, etc.
SOCIAL STUDIES SKILLS: Skills involving investigation and application of social concepts.	This icon marks activities which stress competencies in fields relating to human society and its distribution and relationships. This includes areas such as history, geography, government and politics, economics, psychology, sociology, demographics, current events, cross-cultural studies, consumer issues, environmental issues, and ethical concerns in science and technology.

USING THIS PUBLICATION

Impact Statements

STUDENT'S SECTION

There are five areas of human culture for which each TLA has an impact. These impact statements appear during Day Eight, after the student has gained some familiarity with the technology.

❶ *ENVIRONMENTAL IMPACT:* A statement introducing the student to the impact of the technology on the environment.

❷ *SOCIAL/CULTURAL IMPACT:* A statement concerning the impact of the technology on society and culture.

❸ *ECONOMIC IMPACT:* A statement concerning the impact of the technology on the economy.

❹ *POLITICAL IMPACT:* A statement concerning the impact of the technology on politics, laws, and regulations, and the impact of politics on the development of the technology.

❺ *ERGONOMIC IMPACT:* A statement concerning the ergonomic implications of the technology. Ergonomics is the study of developing products and systems that meet peoples' needs.

Impact Statements offer the student the opportunity to see beyond the activities in the Technology Learning Lab and glimpse the real-world applications of the technology.

Career Search

Also on Day Eight, the students are given the assignment of investigating several career opportunities related to the technology of the TLA. The investigation is done with *Career Search Abstracts.* A list of up to five careers related to the TLA is given, followed by pages from *Career Search Abstracts* that detail the career qualifications and work environment. The student is required to choose two of the five related careers, read the appropriate abstracts, then write a short essay about why those careers may be appealing.

Posttest Instructions

The students are required to take a Posttest as one of the last day's activities. The instructions for the Posttest are given in this section. The score for the Posttest may be compared to the score for the Pretest to help determine the student's gain during the TLA.

USING THIS PUBLICATION

Skunk Works

STUDENT'S SECTION

Skunk Works, a Day Eight optional activity, include instructions that could be used for solving problems or reinforcing the enrichment of learning.

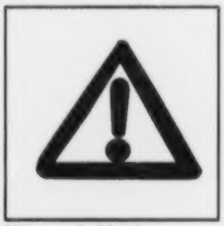
The term Skunk Works was coined by engineers at 3M Corporation in the mid-1960s. Some engineers wanted to develop a new product, but company management would not give them the time or money to work on the project. So the engineers "borrowed" time and money from approved projects to work on their "Skunk Works." When they finished developing the product, they presented it to management and it has been a 3M product ever since. The product: Velcro fasteners.

HAZARD ALERT MESSAGES

The Daily Activities include hazard alert information specific to the Activity. These messages should be discussed carefully and thoroughly. The Hazard Alert Message system used in the TLA is based on the American National Standards Institute (ANSI) Standard Z535, which provides for five levels of alert.

Students are introduced to the ANSI Hazard Alert Message system as an activity in the Laboratory Safety for Construction Technology TLA (TE1107/TE3107). This system was adopted by ANSI as the standard in 1990 and will be the hazard alert system in use when students reach the workplace.

Hazard Alert Messages in the TLA are indicated both by the color red and graphically. There are three types of hazard alert graphics used in the TLA: the hazard alert symbol, injury hazard graphics, and avoidance graphics.



Hazard Alert Symbol

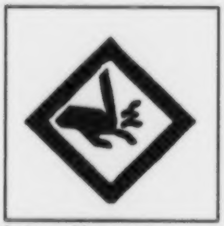
This Hazard Alert Symbol is used with the words DANGER, WARNING, and CAUTION. ANSI defines these words as:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

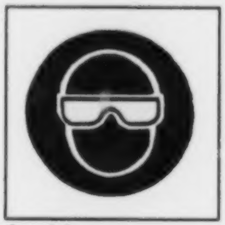
CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

HAZARD ALERT MESSAGES



Injury Hazard Graphic

There are two types of graphics used in conjunction with the hazard alert symbol. This type of graphic depicts a specific injury that may be expected if the hazard described in the alert is not avoided.



Avoidance Graphic

This second type of graphic is called an avoidance graphic. It depicts an action the student should take in order to avoid injury.

There are two other ANSI words used in the TLAs and the students should understand their meanings:

NOTICE indicates an action that could result in damage to property or equipment.

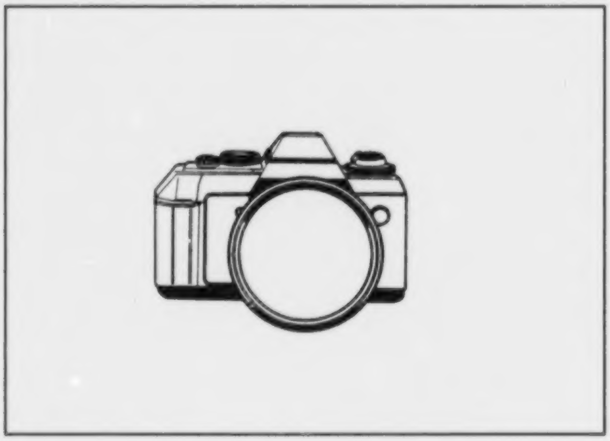
IMPORTANT indicates an instruction that can help the student do a better job.

TECHNOLOGY EDUCATION

PHOTOGRAPHY

TE1130/TE3130

INSTRUCTOR'S SECTION



92-009267

BACKGROUND INFORMATION

Most students have had some exposure to photography, whether they have taken instant pictures with a Polaroid camera or have used a camera with manual settings. Students taking the Photography TLA will not only learn the basics of photography using a single lens reflex camera, but will also have the opportunity to develop their own black-and-white negatives and make prints.

Along with technical knowledge, this TLA also provides information on photo composition that will benefit students whether they are using a Polaroid camera or a video camera.

INSTRUCTOR'S SECTION

EXPECTED LEARNER OUTCOMES

INSTRUCTOR'S SECTION

- The student will know and appreciate the importance of technology and technological literacy.
- The student will explore career opportunities so you can make meaningful occupational choices.
- The student will explore future educational opportunities so you can make meaningful educational choices.
- The student will apply problem-solving and critical thinking techniques.
- The student will apply math, science, reading, and other school subjects in a practical situation.
- The student will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- The student will recognize and develop individual talents.
- The student will think logically and sequentially.

— Continued —

EXPECTED LEARNER OUTCOMES

- The student will develop leadership, creative abilities, positive self-concepts, and individual potential in a technological society.
- The student will become a more sophisticated consumer of the goods and services of a technological society.
- The student will adjust to a changing technological environment.
- The student will develop an understanding of and the ability to adapt to those technological forces that influence life in the 21st century.
- The student will apply design, imagination, and creative abilities.
- The student will learn application of lifelong learning skills.
- The student will think globally and act locally.

INSTRUCTOR'S SECTION

SUGGESTED ACTIVITIES

✓ Obtain materials to supplement TLA.

See Suggested Resources for computer software and books to supplement this module.

✓ Review instructional outline for this TLA. Modify time frames to suit class needs and plan activities for each class period.

✓ Study the specific objectives to determine those you will cover in your presentation. Decide also which objectives should be taught to which students.

✓ Determine scope and sequence of objectives that you add to the TLA. Design and develop support materials, including evaluation techniques, for additional objectives.

✓ Determine how you will schedule time for students to demonstrate competence in the required procedures.

✓ Make arrangements for guest speakers. Supply speakers with specific objectives and other appropriate sections of this TLA.

INSTRUCTOR'S SECTION

PREPARATION

SUGGESTED ACTIVITIES

INSTRUCTOR'S SECTION

- ✓ Provide examples of photographs from both professional sources and students.
- ✓ Determine how long each of the chemicals used in the development process should be used (this varies with different brands) and decide whether students should re-use the chemicals or dispose of them. Post a sign in the darkroom to remind students of these procedures.

SUGGESTED RESOURCES

Hawksby, Peter and Jane Chisolm. *Beginner's Guide to Cameras and Photography*, Usborne: London, England, 1979.

Barden, Robert and Michael Hacker. *Communication Technology*, Delmar Publishers Inc.: Albany, NY, 1990.

Hawksby, Peter and Jane Chisolm. *Beginner's Guide to Cameras and Photography*, Usborne: London, England, 1979.

INSTRUCTOR'S SECTION

WORKSTATION BOOKSHELF

INSTRUCTOR'S REFERENCE MATERIALS

Instructional Sequence	Technology Education: Photography		
	Assignments	**Equipment, Tools, and Supplies**	**Facilities Requirements/ Modifications**
Day 1	Complete Pretest Read Assignments to Turn In, Goal, Expected Learner Outcomes, Objectives, Academic and Workplace Applications, and Information Sheet	Computer scan sheet/card or notebook paper #2 Pencil	
Day 2	Read Information Sheet Complete Objective 1: Answer questions about elements of photography	Computer scan sheet/card or notebook paper #2 Pencil	
Day 3	Complete Objective 2: Load camera with film and adjust camera settings properly for film Complete Objective 3: Take pictures following exposure and composition guidelines in information sheet	Camera Instruction manual for camera Roll of black and white film Scissors Pencil Paper	
Day 4	Complete Objective 4: Practice rolling film onto film reel Complete Objective 5: Roll and develop film according to instructions on film package	Film reel Roll of old negatives Darkroom Developing tank and reel Sink with hot and cold water Developer Stop bath Fixer Fixer Neutralizer Wetting agent Photo thermometer Bottle opener Scissors Minute timer Squeegee Negative clips and negative drying line	

Technology Education: Photography

Instructional Sequence	Assignments	Equipment, Tools, and Supplies	Facilities Requirements/ Modifications
Day 5	Complete Objective 6: Print contact sheet for roll of developed negatives Complete Objective 7: Print a test strip for a photograph and select the best exposure time	Negatives Scissors Plastic negative carrier Darkroom with enlarger Thermometer Photographic paper Glass plate, 8" x 10" Developer Stop bath Fixer Sink with running water Pans for chemicals (3) Tongs (3) Masking frame Black card, 8" x 10" Timer	
Day 6	Complete Objective 8: Print a photograph using the exposure time from Objective 7 Complete Objective 9: Use a mask to create a special effect with a print	Negatives Scissors Plastic negative carrier Darkroom with enlarger Thermometer Photographic paper Glass plate, 8" x 10" Developer Stop bath Fixer Sink with running water Pans for chemicals (3) Tongs (3) Masking frame Black card, 8" x 10" Timer	

Instructional Sequence	Technology Education: Photography		
	Assignments	**Equipment, Tools, and Supplies**	**Facilities Requirements/ Modifications**
Day 7	Complete Objective 10: Write a one-page essay describing the activities performed in this TLA.	Paper, 8.5" x 11" Pen or pencil	
Day 8	Complete any unfinished assignments Read Impact Statements Complete Career Search Activity Complete Posttest	Computer scan sheet/card or notebook paper #2 Pencil Notebook paper	
Skunk Works	Make a double-exposure print by combining two negatives on one photograph.	Negatives Darkroom with enlarger Thermometer Photographic paper Developer Stop bath Fixer Sink with running water Pans for chemicals (3) Tongs (3) Masking frame Timer	

BEST COPY AVAILABLE

Equipment, Tools, and Supplies: Summary Worksheet

Equipment, Tools, and Supplies	Per Student	Per Period	Total Needed	Special Considerations	Cost per Student	Cost per Period	Total Cost	Special Considerations
Computer scan sheet card or notebook paper	1							
#2 Pencil	1							
Camera	1							
Instruction manual for camera	1							
Roll of black and white film	1							
Scissors	1							
Notebook paper, 8.5" x 11"	6 sheets							
Film reel	1							
Roll of old negatives	1							
Darkroom with enlarger	1							
Developing tank and reel	1							
Sink with hot and cold running water	1							
Developer	enough for 4 activities							
Stop bath	enough for 4 activities							
Fixer	enough for 4 activities							

BEST COPY AVAILABLE

Equipment, Tools, and Supplies: Summary Worksheet

Equipment, Tools, and Supplies	Per Student	Per Period	Total Needed	Special Considerations	Cost per Student	Cost per Period	Total Cost	Special Considerations
Fixer neutralizer	enough for 1 activity							
Wetting agent	enough for 1 activity							
Photo thermometer	1							
Bottle opener	1							
Minute timer	1							
Squeegee	1							
Negative clips	2							
Negative drying line	1							
Plastic negative carrier	1							
Photographic paper	6 sheets							
Glass plate, 8" x 10"	1							
Pans for chemicals	3							
Tongs	3							
Masking frame	1							
Black card, 8" x 10"	1							
Heavy paper, 8" x 10"	1							

PRETEST

1. When you load a new roll of film, the first camera setting you should adjust is the:
   - a) Aperture
   - b) Film speed
   - c) *f* stop
   - d) Shutter speed

2. A Polaroid (instant) camera makes photographic prints without using:
   - a) Film
   - b) Flash
   - c) Focus
   - d) Negatives

3. The setting to adjust how wide the lens opens is called:
   - a) Aperture
   - b) Bulb
   - c) *F* stop
   - d) Parallax

4. When developing film, the chemicals should be kept at a temperature of approximately:
   - a) 42° F
   - b) 68° F
   - c) 98.6° F
   - d) 125° F

INSTRUCTOR'S SECTION

PART 1

PRETEST

5. Film should be removed from its cartridge and rolled onto the film reel under the "safe light".

   a) True
   b) False

6. When taking pictures of moving objects, you should use a faster shutter speed to prevent blurring the image.

   a) True
   b) False

7. Once it is developed, photographic paper must be protected from light.

   a) True
   b) False

8. The longer you leave a print in the developer, the sharper the image will be.

   a) True
   b) False

9. When taking photographs outside, it is best to keep the sun behind you.

   a) True
   b) False

INSTRUCTOR'S SECTION

PART 2

PRETEST

10. When developing prints, each tray of chemicals must have its own separate tongs.

    a) True
    b) False

Numbers 11 - 15 are for answers to Objective 1.

INSTRUCTOR'S SECTION

PART 3

POSTTEST

16. When you load a new roll of film, the first camera setting you should adjust is the:

    a) Aperture
    b) Film speed
    c) *F* stop
    d) Shutter speed

17. A Polaroid (instant) camera makes photographic prints without using:

    a) Film
    b) Flash
    c) Focus
    d) Negatives

18. The setting to adjust how wide the lens opens is called:

    a) Aperture
    b) Bulb
    c) *F* stop
    d) Parallax

19. When developing film, the chemicals should be kept at a temperature of approximately:

    a) 42° F
    b) 68° F
    c) 98.6° F
    d) 125° F

INSTRUCTOR'S SECTION

PART 1

POSTTEST

20. Film should be removed from its cartridge and rolled onto the film reel under the "safe light".

    a) True
    b) False

21. When taking pictures of moving objects, you should use a faster shutter speed to prevent blurring the image.

    a) True
    b) False

22. Once it is developed, photographic paper must be protected from light.

    a) True
    b) False

23. The longer you leave a print in the developer, the sharper the image will be.

    a) True
    b) False

24. When taking photographs outside, it is best to keep the sun behind you.

    a) True
    b) False

INSTRUCTOR'S SECTION

PART 2

POSTTEST

25. When developing prints, each tray of chemicals must have its own separate tongs.

    a) True
    b) False

26. Apature
27. Focal Point
28. Negative
29. *F* Stop
30. Shuttur
31. Zoom Lens
32. Filmspeed
33. Darkroom
34. Telephoto Lens
35. View Finder

INSTRUCTOR'S SECTION

PART 3

SPELLING TEST

TEST ANSWERS

INSTRUCTOR'S SECTION

PRETEST ANSWERS

1. B
2. D
3. A
4. B
5. B
6. A
7. B
8. B
9. A
10. A

OBJECTIVE 1 ANSWERS

11. D
12. A
13. A
14. B
15. B

POSTTEST ANSWERS

16. B
17. D
18. A
19. B
20. B
21. A
22. B
23. B
24. A
25. A

SPELLING TEST ANSWERS

26. B
27. B
28. A
29. A
30. B
31. A
32. B
33. A
34. A
35. B

EVALUATION SUMMARY

5 POINTS EACH:

Pretest ______

Career Search ______

10 POINTS EACH:

Objective 1: Answer questions about photography. ______

Objective 2: Load camera with film. ______

Objective 3: Take photographs. ______

Objective 4: Practice rolling exposed film. ______

Objective 5: Prepare chemicals and roll and develop film. ______

Objective 6: Print contact sheet for developed film. ______

Objective 7: Print test strip for photograph. ______

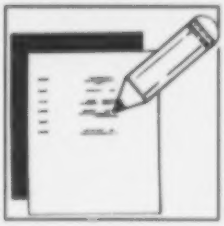
Objective 8: Print and develop photograph. ______

Objective 9 Use mask to achieve special effect. ______

Objective 10: Write one-page essay on photography. ______

INSTRUCTOR'S SECTION

1. **PROCESS EVALUATION**



1. **PROCESS EVALUATION SCORE______**

EVALUATION SUMMARY

The instructor is encouraged to individualize the TLA to address the specific needs of each student, considering age and ability level. In addition to the specific areas on the chart below, the instructor should take into account the student's desire, enthusiasm, etc.

Evaluation based upon observed performance = 40 possible points.

Each finished product is worth 10 possible points, broken down as follows:

EVALUATION RATING TABLE

Student Name:________________

Criteria	Points Possible	Points Earned
CONTACT SHEET		
In focus	5	____
All negatives shown	5	____
TEST STRIP		
Exposed in 5-second increments	5	____
In focus, developed properly, etc.	5	____
PHOTOGRAPH		
Exposed correctly according to test strip	2	____
Aligned properly, in focus, etc.	2	____
Developed correctly	6	____

INSTRUCTOR'S SECTION

2. PRODUCT EVALUATION

EVALUATION SUMMARY

Criteria	Points Possible	Points Earned
SPECIAL EFFECT PHOTOGRAPH		
Mask used correctly to achieve effect	5	____
Exposed properly according to test strip	2	____
In focus, etc.	3	____

INSTRUCTOR'S SECTION

2. PRODUCT EVALUATION SCORE_____

EVALUATION SUMMARY

Use the conversion table below to convert Product Evaluation scores to percentiles.

40 = 100%
39 = 97.5
38 = 95
37 = 92.5
36 = 90

35 = 87.5
34 = 85
33 = 82.5
32 = 80

31 = 77.5
30 = 75
29 = 72.5
28 = 70

27 = 67.5
26 = 65
25 = 62.5
24 = 60

INSTRUCTOR'S SECTION

CONVERSION TABLE

EVALUATION SUMMARY

Posttest score _____

EVALUATION WORKSHEET

1. Process evaluation score = _____
2. Product evaluation score = _____
3. Written evaluation score = _____

4. Total score = _____

Divide Total Score by 3 to get TLA score.

INSTRUCTOR'S SECTION

3. WRITTEN EVALUATION

3. WRITTEN EVALUATION SCORE______

Total Score for TLA =

1 + 2 + 3 = Total Score

Total Score/3 = SCORE

TLA SCORE: ______

BIBLIOGRAPHY

Barden, Robert and Michael Hacker. *Communication Technology*, Delmar Publishers Inc.: Albany, NY, 1990.

Hawksby, Peter and Jane Chisolm. *Beginner's Guide to Cameras and Photography*, Usborne: London, England, 1979.

INSTRUCTOR'S SECTION

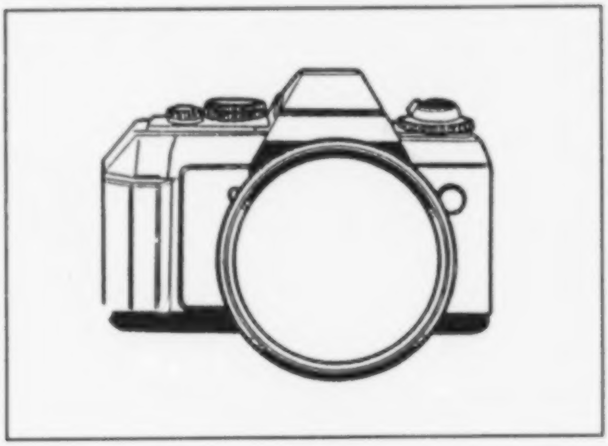
TECHNOLOGY EDUCATION

TECHNOLOGY
LEARNING
ACTIVITY

TE3130

PHOTOGRAPHY

Suggested Time: 8 Days



Developed by the
Curriculum and Instructional Materials Center
for the Technology Education Division
Oklahoma Department of Vocational and Technical Education

92-009267

©
Copyright 1992

Oklahoma Department of Vocational and Technical Education
Curriculum and Instructional Materials Center

All rights reserved.

Printed in the United States of America by the
Oklahoma Department of Vocational and Technical Education
Stillwater, Oklahoma 74074-4364

Cover photo Courtesy NASA

This publication, or parts thereof, may not be reproduced in any form by photographic, electrostatic, mechanical, or other methods, for any use including information storage and retrieval, without written permission from the publisher.

Use of commercial products in these instructional materials does not imply endorsement by the Oklahoma Department of Vocational and Technical Education.

The Oklahoma Department of Vocational and Technical Education does not discriminate on the basis of race, creed, color, national origin, sex, age, veteran status, or qualified handicap.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 1 you should complete the following activities:

1. Complete Pretest
2. Read Assignments to Turn In (items to complete in 8 days)
3. Read Goal
4. Read Words You Should Know
5. Read Expected Learner Outcomes
6. Read Objectives
7. Read Related TSA Competitive Events
8. Read Academic and Workplace Applications
9. Read Information Sheet

DAY 1 ACTIVITIES

SUMMARY OF ACTIVITIES

Functional Reading Skills:
- Use content area vocabulary
- Follow written instructions

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

PRETEST

INSTRUCTIONS

You will need a computer scan sheet or card to record your answers to the following Pretest. Be sure to write your name, the title of the TLA, the date, and the class period on the computer scan sheet or card using a #2 pencil. Use rows 1-10 to record the answers to the Pretest. If your answers will be hand-scored, use a blank sheet of paper to record your answers and number your answers 1-10.

Get Pretest Questions from your instructor.

When you finish the Pretest, return the test form and the computer scan card or notebook paper to your instructor.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

ASSIGNMENTS TO TURN IN

At the end of 8 days, you should give the following items to your instructor for evaluation:

1. **Computer score card/sheet, with answers to:**
   - a) Pretest
   - b) Answers to Day 2 Activities
   - c) Posttest (including spelling test)
2. **Negatives (in plastic sleeve) and contact sheet from one roll of film**
3. **Test strip and finished print from one negative**
4. **Test strip and finished special effect print created by using a mask**
5. **One-page essay describing what you did in this TLA**
6. Career Search Activity
   - a) Two careers identified
   - b) Explanation of why those occupations appealed to you

TECHNOLOGY EDUCATION PHOTOGRAPHY

The Photography TLA will introduce you to basic black-and-white photography techniques. You will learn how to take photographs using rules of good composition. You will also learn to develop exposed film and print photographs from your own negatives.

DAY 1 ACTIVITIES

GOAL

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

WORDS YOU SHOULD KNOW

Aperture — opening in the camera lens that allows light to strike the film.

Contrast — the difference between two things. A good photograph has high contrast because it has some very light and some very dark objects.

Darkroom — a room which can be closed and made completely dark, so film can be developed without being ruined.

***F* stop** — unit used to measure the aperture setting.

Film speed — rating system that indicates proper lighting conditions for a type of film.

Focal point — an interesting object which attracts attention in the photograph.

Lens — part of a camera that focuses light onto the film.

Negative — film after developing, which shows dark as light and light as dark.

Print — a picture made from a negative. Also used for the process of making a picture from a negative.

— Continued —

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

WORDS YOU SHOULD KNOW

Safe light — a red or yellow light which will not expose film. All other light will expose film.

Shutter — part of a camera that controls the amount of light exposing film.

Shutter speed — camera setting that determines how long the shutter remains open.

Single-lens reflex camera (SLR) — type of camera that has one lens that the photographer looks through when taking the picture.

Telephoto lens — lens that makes the subject appear closer to the photographer than it really is.

Viewfinder — part of a camera used to see what is visible through the lens.

Wide-angle lens — lens that provides a wide view of a subject.

Zoom lens — an adjustable telephoto lens.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

EXPECTED LEARNER OUTCOMES

- You will know and appreciate the importance of technology and technological literacy.
- You will explore career opportunities so you can make meaningful occupational choices.
- You will explore future educational opportunities so you can make meaningful educational choices.
- You will apply problem-solving and critical thinking techniques.
- You will apply math, science, reading, and other school subjects in a practical situation.
- You will develop basic skills in the safe and proper use of tools, machines, materials, processes, and technical concepts.
- You will recognize and develop individual talents.
- You will develop an understanding and the ability to adapt to those technological forces that influence life in the 21st Century.
- You will apply design, imagination, and creative abilities.

— Continued —

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

EXPECTED LEARNER OUTCOMES

- You will think logically and sequentially.
- You will develop leadership, creative abilities, positive self-concepts, and individual potential in a technological society.
- You will become a more sophisticated consumer of the goods and services of a technological society.
- You will adjust to a changing technological environment.
- You will learn application of lifelong learning skills.
- You will think globally and act locally.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

OBJECTIVES

At the completion of this Technology Learning Activity, you should be able to:

1. Correctly answer multiple choice questions about elements of photography.
2. Load camera with film and adjust camera settings properly for type of film used.
3. Take pictures, following exposure and composition guidelines given in the information sheet.
4. Practice rolling old film onto film reel until you can roll it all onto the reel.
5. Roll and develop exposed film according to instructions on chemical package.
6. Print a contact sheet for a roll of developed negatives.
7. Print a test strip for a photograph and select the best exposure time.
8. Print a photograph using the exposure time determined by the test strip.

— Continued —

OBJECTIVES

9. Use a mask to create a special effect with a print, using the same negative as used in the last objective.

10. Write a one-page essay, using correct grammar and spelling, describing the process of shooting, developing, and printing your photographs.

Related TSA Competitive Events

The following TLA Competitive Events apply to your study of Photography.

- Extemporaneous Speech
- Prepared Speech
- Research Paper

See *TSA Competitive Events Guidelines* for specific details on the competitions.

TECHNOLOGY EDUCATION PHOTOGRAPHY

The symbols in the right column are used to identify the Academic and Workplace Applications that are reinforced by specific activities in this TLA.

Reading Skills Applied:

Research and Reference Skills:
- Use in-book reference tools

Functional Reading Skills:
- Follow written instructions
- Use content area vocabulary

Writing Skills Applied:

Language Skills:
- Use standard grammar
- Use complete sentences
- Use correct spelling

Composition Skills:
- Compose essays

Functional Writing Skills:
- Complete forms & records

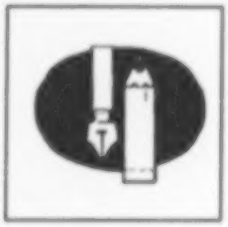
Employability Skills Applied:

Job Search/Selection Skills:
- Investigate employment prospects of a occupation
- Analyze duties of specific job

— Continued —

DAY 1 ACTIVITIES

ACADEMIC AND WORKPLACE APPLICATIONS



ACADEMIC AND WORKPLACE APPLICATIONS

Creative Thinking and Problem Solving Skills Applied:

- Evaluate alternatives
- Select an alternative
- Create a finished product
- Transfer training to new situations
- Apply new technology

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

INFORMATION SHEET

HISTORY OF PHOTOGRAPHY

The first photograph was made by Frenchman Joseph Nicephore Niepce in 1826. It took eight hours of exposure to record the image (today's photographs are exposed in fractions of a second).

The next photographs were called *daguerreotypes* after their inventor, Frenchman Louis Daguerre. These photographs were printed on metal plates.

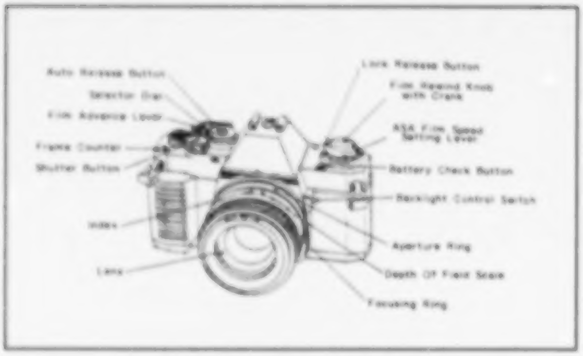
Photography was almost entirely limited to professionals until the late 1800s, when George Eastman introduced the first Kodak camera. When purchased, the camera was already loaded with enough film for 100 pictures. After taking the pictures, the customer would send it back to the Kodak Company where the film would be removed and developed, and photographs printed. The photos and camera (reloaded with film) were returned to the photographer. This innovation put photography within most people's reach.

Another innovation came in 1947 with the release of the Polaroid Land Camera. This camera, invented by Dr. Edwin H. Land, made a black-and-white print in less than one minute without a negative. Today, Land cameras (also known as *instant cameras*) can take color pictures and are very popular.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

PARTS OF A CAMERA


Auto Release Button
Selector Dial
Film Advance Lever
Frame Counter
Shutter Button
Index
Lens
Lock Release Button
Film Rewind Knob with Crank
ASA Film Speed Setting Lever
Battery Check Button
Backlight Control Switch
Aperture Ring
Depth Of Field Scale
Focusing Ring

There are several different types of cameras, but all have many of the same parts. A camera is basically a light-tight box with a film holder to carry the film, a lens to focus light on the film, and a shutter that opens and closes to control the amount of light exposing the film. All cameras have a viewfinder which the photographer looks through to see what the picture will look like.

Many photographers like to use different types of lenses.

- **Wide-angle** lenses give a much wider view of a subject and are often used for photos of scenery such as skylines or mountains.
- **Telephoto** lenses are similar to a telescope — they make the subject of the photograph appear closer.
- **Zoom** lenses are similar to telephoto lenses, except they are adjustable for normal or telephoto views.

— Continued —

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 1 ACTIVITIES

Twin lens reflex cameras (TLRs) have two lenses — the one the photographer looks through, and the one that exposes the film. Because there is a slight difference in the view from the two lenses, a photographer will find that the final photograph is not exactly the same as what was seen in the viewfinder. This problem is called *parallax error.* On a single lens reflex camera (SLR), the photographer looks through the same lens that exposes the film.

CAMERA SETTINGS

Many cameras sold today are automatic cameras, intended mainly for amateur photographers. These cameras automatically adjust most, if not all, camera settings. Other cameras, used by professionals and serious amateurs, require that the photographer adjust the camera settings according to the film used, available light, and type of subject.

When adjusting the camera settings manually, the first thing to do is set the film speed. The film speed is shown by an ASA number (also known as the ISO number) — the higher the number, the "faster" the film is. Fast films, like 1000 or 1200, are best for low-light situations, such as pictures taken at night or indoors. Slower films, like 100 or 200, are good for pictures taken in bright light.

— Continued —

The next settings are shutter speed, which determines how long the film is exposed to light, and aperture, which determines how wide the shutter will open. These two settings work together according to the photographic conditions.

Shutter speed is set manually by a dial on top of the camera and measured in fractions of a second (for example, if the shutter speed dial reads 60, the shutter will open for 1/60 second.) The larger the number, the faster the shutter speed. The B setting leaves the shutter open as long as you hold down the shutter button. This is used for taking pictures in low-light conditions. Faster speeds are necessary to prevent blurring when taking pictures of moving objects. For example, if you are taking pictures of a car race, you would choose a fast speed, like 1/500. If you want to take a picture of something which is not moving, or not very well lit, you would choose a slow speed, like 1/60.

Aperture is set manually by adjusting a ring on the lens and is measured in *f* stops. The smaller the *f* stop, the wider the lens will open. A wide aperture lets in more light. If you are taking pictures in a dark room you would want a smaller *f* stop number.

— Continued —

Generally, a faster shutter speed requires a wider aperture to make sure enough light is allowed into the camera. Many cameras adjust both shutter speed and *f* stop automatically. Some cameras have a built-in light meter which tells the photographer if the settings are not appropriate for the amount of light. In this case, the photographer may choose to use a flash to increase the amount of light. Some cameras have a built-in flash that automatically goes off if needed.

FOCUSING

Focusing is relatively easy with an autofocus camera, which uses infrared sensors to focus on the subject, or a fixed-focus camera, which has a relatively large, non-adjustable field of focus. These types of cameras sometimes have an override setting for people who prefer to occasionally focus manually. A true manual focus camera often has a device in the viewfinder which helps the photographer tell when the subject is in focus.

If you complete Day 1 Activities with time left over, you may begin Day 2 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 2 you should complete the following activities:

❶ Read Information Sheet

❷ Complete Objective 1

DAY 2 ACTIVITIES

SUMMARY OF ACTIVITIES

Functional Reading Skills:
- Follow written instructions
- Use content area vocabulary

Reading Comprehension Skills:
- Draw conclusions

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 2 ACTIVITIES

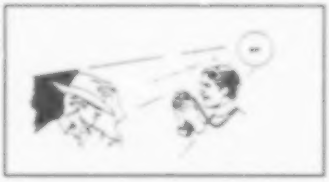
INFORMATION SHEET

GUIDELINES FOR GOOD PHOTO COMPOSITION

Composing photographs is a creative activity. There are no rules that **must** be followed. However, there are several helpful guidelines that can increase your chances of being pleased with the photographs you take.

First, think about what you want to photograph — a landscape, for example. Many people return from vacations with dozens of pictures of trees, beaches, or grassy fields. Most of these pictures would be more interesting if there was something else in them — a building, a fence, an animal, a sunset. Try to have some kind of focal point in all of your photos.

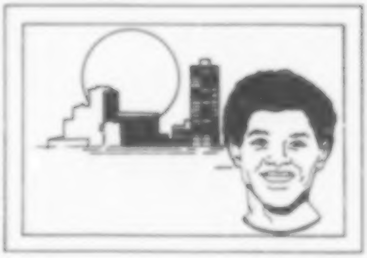
It is best to have the sun **behind** you when taking a picture. This prevents the sun from shining into the camera, which can ruin your picture. However, you should make sure that your shadow is not visible in the viewfinder. If you are taking a photograph of a person, you do not want them to have to look directly into the sun — this will cause them to squint. Because of this, you may need to move until the sun is to your side, not directly behind you.



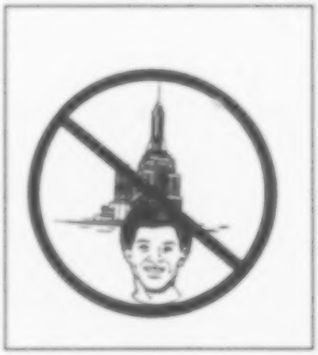
— Continued —

Next, think about the shape of your subject. Is it wide or tall? Remember, you can always hold your camera sideways to get a "taller" picture. Remember this when taking pictures of people, especially when they are standing.

Now think about the placement of your focal point. Many professional photographers prefer to have the focal point slightly off center, rather than directly in the center of the photograph. This makes the picture more interesting.



If you are taking a picture of a person, pay close attention to the background. Objects directly behind the person, such as trees, buildings, or lampposts, may look as if they are growing out of the person's head. If the background is very cluttered, the subject will not show up very well. Also, a person in dark clothes will not show up well against a dark background, or a person in light clothes against a pale background. Try to get some contrast between the subject and the background.



Of course, these are all just guidelines. The most important thing to remember when taking pictures is to keep your eyes open and your camera ready!

CARE AND STORAGE OF PHOTOGRAPHIC MATERIALS

Light is one of the most important elements of photography. The images on negatives and prints are created by light. Therefore, it is important that you keep unwanted light away from these materials.

Film is protected from light by its canister. However, it is best not to load your camera in a very bright place or in full sunlight. Once you have loaded your camera, **never** open it until you have rewound the film into its protective canister. Removing the film from its canister for developing must be done in total darkness — even the red or yellow "safe light" must be turned off.

Photographic paper is not quite as sensitive as film, but it should still be stored carefully. **Never** open a package of photographic paper outside the darkroom. You may handle the paper under the safe light, but too much exposure to even safe light will cause it to "fog," or turn dark. Always keep the protective plastic bag closed, as well as the outer box. Paper should be stored in a closet or drawer.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 2 ACTIVITIES

OBJECTIVE 1

Correctly answer multiple choice questions about elements of photography.

INTRODUCTION

In this activity you will answer some questions about what you read in the information sheet. If you have problems with these questions, you should read the information sheet again before you begin taking photographs.

INSTRUCTIONS

You will need a computer scan sheet or card to record your answers to the following questions. Be sure to write your name, the title of the TLA, the date, and the class period on the computer scan sheet or card using a #2 pencil. Use rows 11 - 15 to record the answers to this exercise. If your answers will be hand-scored, use a blank sheet of paper to record your answers and number your answers 11-15.

11. You are taking pictures of a motorcycle race on a sunny day. Which shutter speed would probably work best?

    a) 1/30
    b) 1/60
    c) 1/250
    d) 1/500

— Continued —

12. You are taking a picture of a friend sitting under a tree on a cloudy day. Which *f* stop would probably work best?

    a) 5.6
    b) 8
    c) 11
    d) 16

13. If you use a fast shutter speed, you should also use a higher *f* stop.

    a) True
    b) False

14. Undeveloped photographic paper can be handled with the safe light on, but film can not.

    a) True
    b) False

15. Always try to keep the sun behind you when taking pictures outside.

    a) True
    b) False

When you finish the questions, return the computer scan card or notebook paper to your instructor.

If you complete Day 2 Activities with time left over, you may begin Day 3 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 3 ACTIVITIES

On Day 3 you should complete the following activities:

1. Complete Objective 2
2. Complete Objective 3

SUMMARY OF ACTIVITIES

- Transfer training to new situations
- Apply new technology

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 3 ACTIVITIES

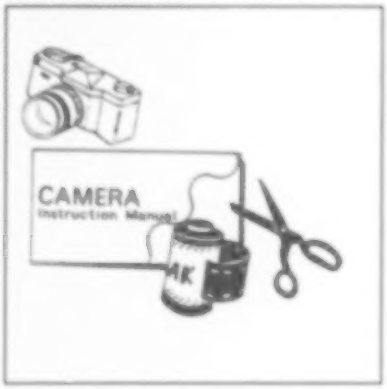
OBJECTIVE 2

Load camera with film and adjust camera settings properly for type of film used.

INTRODUCTION

In this activity you will load film into your camera and adjust the film speed setting according to what type of film you are using.

TOOLS AND MATERIALS



- Camera
- Instruction manual for camera
- Roll of black and white film
- Scissors

PROCEDURE

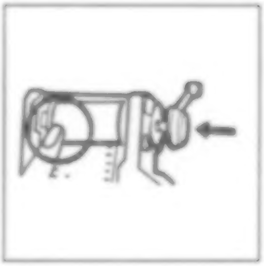
FOLLOW THESE STEPS:

STEP 1: Read the instructions on loading film in your camera's instruction manual. Note the location of the release to open the camera back.

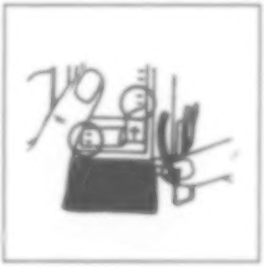
FOLLOW THESE STEPS:

STEP 2: While inside the lab, remove the film from its plastic canister (save the canister for use later). Use the scissors to round off the corners of the end of film sticking out of the cartridge. This will make the film easier to load.

STEP 3: Snap the roll of film in place in the camera and insert the end of the film according to the directions in the instruction manual. Close the back of the camera.

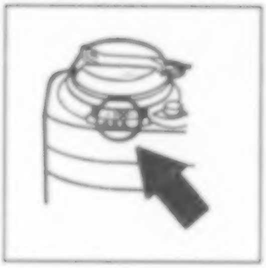


STEP 4: If your camera winds film automatically, you should hear the motor run until the film is caught and wound. If your camera does not wind film automatically, wind the film according to the instructions in the manual until you feel it catch. You should hear a click and the film unwinding. If you do not hear or feel the film catch, repeat step 3, or get your instructor's help.



FOLLOW THESE STEPS:

STEP 5: If your camera does not set the film speed automatically, adjust the film speed dial until the number showing is the same as the ISO/ASA number on the film package.



Continue Day 3 Activities by completing Objective 3.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 3 ACTIVITIES

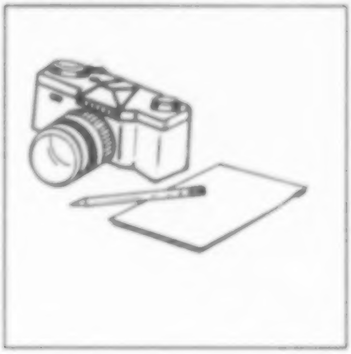
OBJECTIVE 3

Take pictures, following exposure and composition guidelines given in the information sheet.

INTRODUCTION

In this activity you will use what you have learned from the information sheet, along with your own creativity, in taking photographs. Remember to use the guidelines of good photo composition, from the Information Sheet on Day 2.

TOOLS AND MATERIALS



- Camera (loaded with film)
- Pencil
- Paper

PROCEDURE

FOLLOW THESE STEPS:

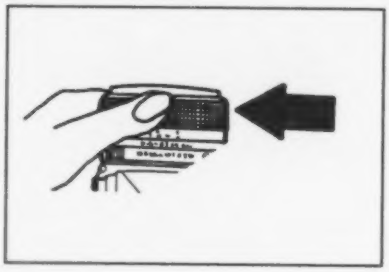
STEP 1: If you have a flash, or if your lab is very bright, take photos inside the lab. If not, ask your instructor for permission to go outside to take pictures.

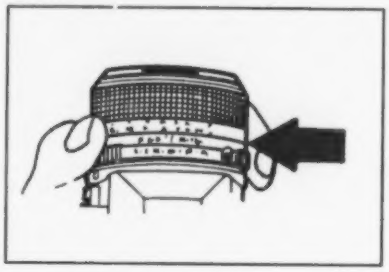
TECHNOLOGY EDUCATION PHOTOGRAPHY

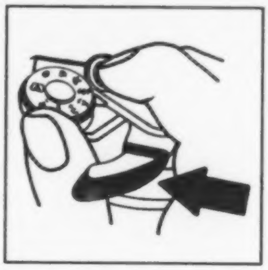
DAY 3 ACTIVITIES

FOLLOW THESE STEPS:

STEP 2: If your camera does not automatically focus or adjust camera settings, make sure to adjust for each picture. **Do not adjust the film speed setting once it has been set correctly.** Write down the *f* stop and shutter speed you use for each picture. Wind the film after each picture if your camera does not do it automatically.







FOLLOW THESE STEPS:

STEP 3: When you finish, clean work area and return equipment to the proper storage areas.

If you complete Day 3 Activities with time left over, you may begin Day 4 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 4 you should complete the following activities:

❶ Complete Objective 4

❷ Complete Objective 5

DAY 4 ACTIVITIES

SUMMARY OF ACTIVITIES

- ♦ Transfer training to new situations
- ♦ Apply new technology

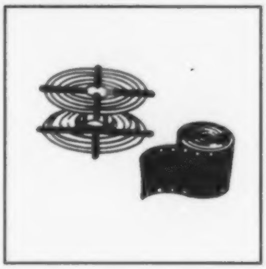
OBJECTIVE 4

Practice rolling old film onto film reel until you can roll it all onto the reel.

INTRODUCTION

For this activity you will learn how to roll film onto a reel for developing. Rolling film is a tricky process because you must do it in total darkness, although you can practice in the light. However, it is very important to learn this skill — if you do not roll your film correctly onto the reel, you will ruin some or all of your pictures.

TOOLS AND MATERIALS



- Film reel
- Roll of old negatives
- Darkroom

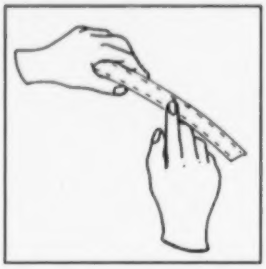
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

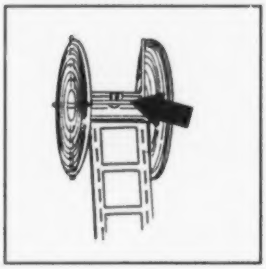
FOLLOW THESE STEPS:

PROCEDURE

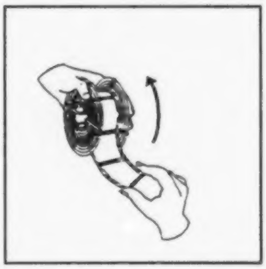
STEP 1: Take the roll of old negatives that you will be using for practice and feel the film near the edges to find the rough side. This is the side with the light-sensitive chemicals.



STEP 2: With the rough side facing inward, start the film on the reel. Some reels look like a wheel with knobs or spokes at the outside. These have a clip for the film at the center of the wheel. Others have two circular surfaces that can twist in opposite directions. These have a groove for the end of the film.



STEP 3: Wind the film around the reel. On a "spoke" reel, wind the film carefully between the spokes. On a "twist" reel, turn the sides of the wheel in opposite directions until the film is wound onto the reel. For both kinds of reel, make sure the film does not crease at any point.



FOLLOW THESE STEPS:

STEP 4: Repeat steps 1 - 3 until you have rolled the film correctly at least twice. Then go into the darkroom and roll the film without looking at it. Practice until you have rolled with film correctly twice in total darkness — no safety lights.

Continue Day 4 Activities by completing Objective 5.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

OBJECTIVE 5

Roll and develop exposed film according to instructions on chemical package.

INTRODUCTION

In this activity you will develop the film you have exposed. If you do not have the developing chemicals pre-mixed, you will need to prepare them according to package directions. The amount of chemicals and time needed will vary with the type used. Ask your instructor how much of each chemical you should use and how long you should use each chemical. Also, ask your instructor if you should pour the used chemicals into the sink or back into the original container to be reused.

TOOLS AND MATERIALS

- Exposed film
- Darkroom
- Developing tank and reel
- Sink with hot and cold water

— Continued —

TOOLS AND MATERIALS

- Developer
- Stop bath
- Fixer
- Fixer neutralizer
- Wetting agent
- Photo thermometer
- Bottle opener
- Scissors
- Minute timer
- Squeegee
- Negative clips
- Negative drying line

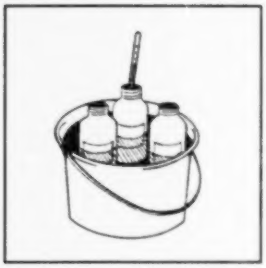
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

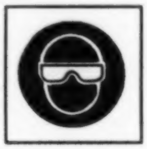
FOLLOW THESE STEPS:

PROCEDURE

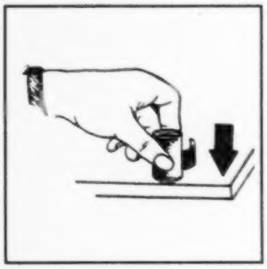
STEP 1: Check the temperature of the chemicals with the photo thermometer. It should be approximately 68° F. If the chemicals are too warm or too cold, put the chemical container into a larger container filled with warm or cold water. Keep checking the temperature until it is within 2 degrees of 68° F.



CAUTION
POISONING OR INJURY POSSIBLE.
Do not swallow chemicals or splash them in eyes.



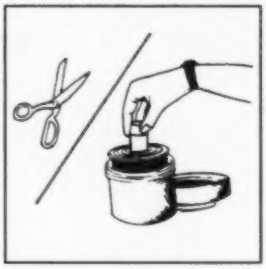
STEP 2: In total darkness, in the darkroom, take the film cartridge and press the knob against a hard surface until the other end pops off and the film slides out.



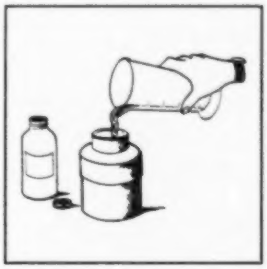
STEP 3: Still in total darkness, wind the film onto the reel, being sure to keep the rough side down.

FOLLOW THESE STEPS:

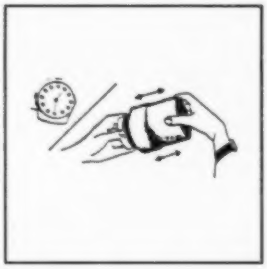
STEP 4: Cut off the spool at the end of the film and put the reel of film into the developing tank. Screw the lid firmly onto the developing tank. **Do not remove the lid until the film has been developed.** Once the lid is on, you can turn on the lights.



STEP 5: Pour the correct amount of developer into the hole in the top of the developing tank. Tap the tank on a hard surface to get rid of any bubbles.

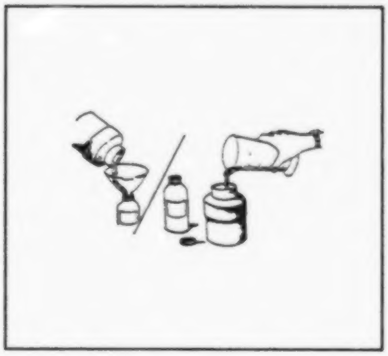


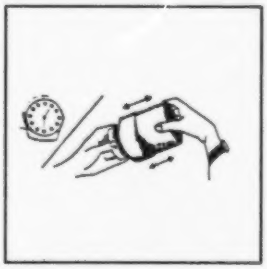
STEP 6: Set the timer for the correct amount of time according to your instructor. Every 30 seconds, gently shake the tank for 10 seconds. Do not hold the tank when you are not shaking it — your body heat will raise the temperature of the developer.



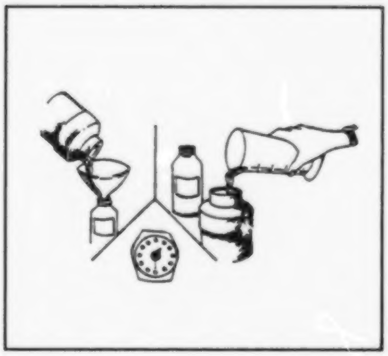
FOLLOW THESE STEPS:

STEP 7: When the time is up, pour out the developer and pour the correct amount of stop bath into the developing tank. Set the timer for the correct amount of time and shake the tank gently. Remember to follow your instructor's directions for handling the used chemicals.





STEP 8: When the time is up, pour out the stop bath and pour the correct amount of fixer into the developing tank. Set the timer for the correct amount of time and shake the tank gently.

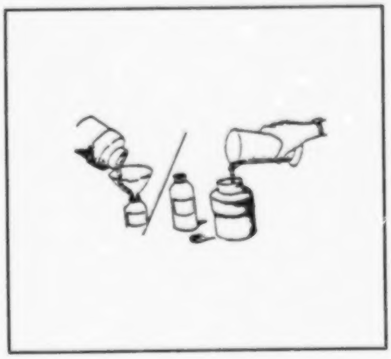


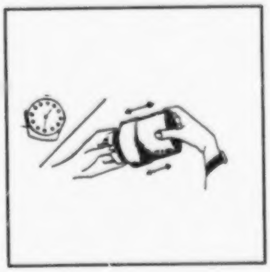
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

FOLLOW THESE STEPS:

STEP 9: When the time is up, pour out the fixer and pour the correct amount of fixer neutralizer into the developing tank. Set the timer for the correct amount of time and shake the tank gently.



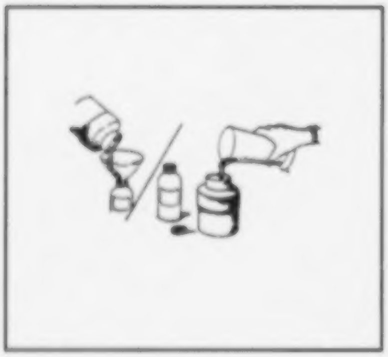


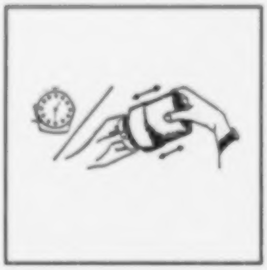
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

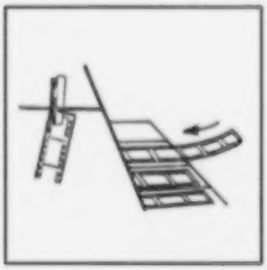
FOLLOW THESE STEPS:

STEP 10: When the time is up, pour out the fixer and pour the correct amount of wetting agent into the developing tank. Shake gently. After about 30 seconds, pour out the wetting agent.





STEP 11: Remove the reel from the tank and take the film off the spool. Use the squeegee to remove excess water from the film. Put clips on both ends of the film and hook one clip to the negative drying line. Allow the negatives to dry overnight.



TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 4 ACTIVITIES

FOLLOW THESE STEPS:

STEP 12:	When you finish, clean work area and return equipment and materials to their proper storage areas.

If you complete Day 4 Activities with time left over, you may begin Day 5 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 5 you should complete the following activities:

1. Complete Objective 6
2. Complete Objective 7

DAY 5 ACTIVITIES

SUMMARY OF ACTIVITIES

- Develop alternatives
- Evaluate alternatives
- Create a finished product

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 5 ACTIVITIES

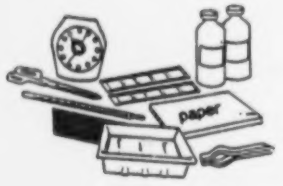
OBJECTIVE 6

Print a contact sheet for a roll of developed negatives.

INTRODUCTION

In this activity you will print a contact sheet, a photo that shows all of the negatives from a roll of developed film. The amount of time the print will need to spend in each chemical depends on the type of chemical and paper used. Ask your instructor how long to use each chemical and what to do with the used chemicals.

TOOLS AND MATERIALS



- Negatives
- Scissors
- Plastic negative carrier
- Darkroom with enlarger
- Thermometer
- Photographic paper
- Glass plate, 8 X 10"

— Continued —

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 5 ACTIVITIES

TOOLS AND MATERIALS

- Developer
- Stop bath
- Fixer
- Sink with running water
- Pans for chemicals (3)
- Tongs (3)
- Masking frame
- Black card, 8 X 10"
- Timer

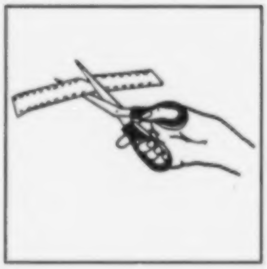
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 5 ACTIVITIES

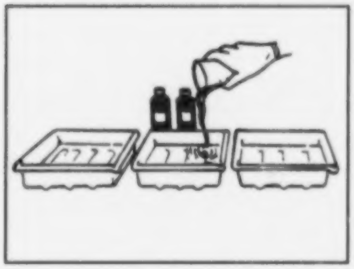
PROCEDURE

FOLLOW THESE STEPS:

STEP 1: Cut the negatives into strips of six negatives each.



STEP 2: In the darkroom, pour the chemicals into the pans and arrange them in the following order (left to right): developer, stop bath, fixer. Check the temperature of all chemicals and adjust, if necessary, by putting the containers into a larger container of warm or cold water. The correct temperature is approximately 68° F. Put one set of tongs in each pan of chemicals.



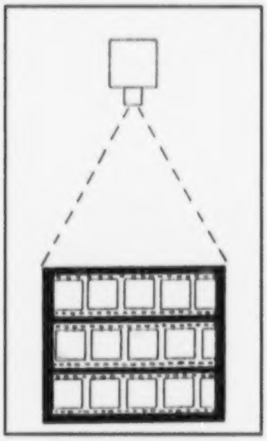
CAUTION
POISONING OR INJURY POSSIBLE.
Do not swallow chemicals or splash them in eyes.

TECHNOLOGY EDUCATION PHOTOGRAPHY

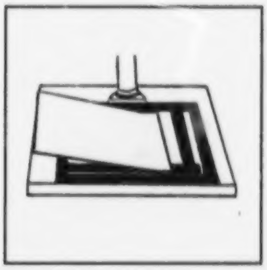
DAY 5 ACTIVITIES

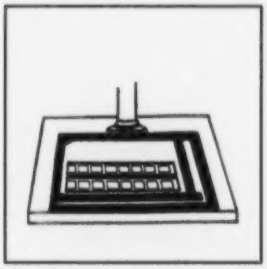
FOLLOW THESE STEPS:

STEP 3: **Put the negative strips on the baseboard of the enlarger and turn it on. Move the enlarger up and down until the light covers all the negatives. Mark where the negatives need to go with the masking frame and remove the negatives.**



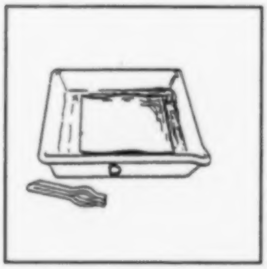
STEP 4: **Turn off the darkroom light and turn on the safety light. Put a piece of photographic paper, shiny side up, on the baseboard inside the masking frame boundaries. Arrange the negatives on top of the paper, dull side down. Cover the negatives with the glass plate.**

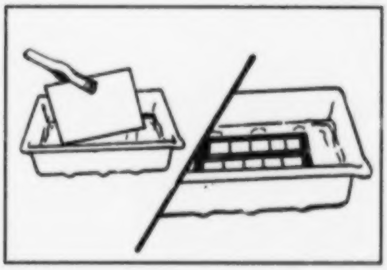


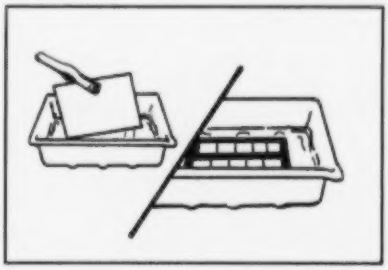


FOLLOW THESE STEPS:

STEP 5:	Turn on the enlarger light for 10 seconds.
STEP 6:	Take the exposed paper and slide it into the pan of developer, shiny side down. Carefully rock the pan and then turn the paper over with the tongs. When the image is clear, pick up the print with tongs and let it drip for a few seconds. Leaving the print in the developer too long will cause it to turn dark.
STEP 7:	Slide the print into the pan of stop bath **without letting the tongs touch the stop bath. Put the developer tongs back in the pan of developer.** Carefully rock the pan for the correct amount of time. Use the stop bath tongs to pick up the print and let it drip for a few seconds.
STEP 8:	Slide the print into the pan of fixer **without letting the tongs touch the fixer. Put the stop bath tongs back in the pan of stop bath.** Carefully rock the pan for the correct amount of time. (Ask your instructor how long.)

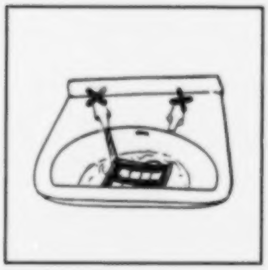






FOLLOW THESE STEPS:

STEP 9: It is safe to turn on the darkroom light now. Put the print in the sink or a print washer and rinse it with running water for a few minutes. At this point you can look at the contact sheet and select one or two negatives that you would like to print. Note the numbers of the negatives and put the contact sheet back in the sink to rinse while you print a photograph.



Continue Day 5 Activities by completing Objective 7.

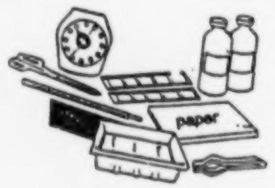
OBJECTIVE 7

Print a test strip for a photograph and select the best exposure time.

INTRODUCTION

In this activity you will print a test strip showing several different exposure times for one negative. You will then select the best exposure time.

TOOLS AND MATERIALS



- Negatives
- Scissors
- Plastic negative carrier
- Darkroom with enlarger
- Thermometer
- Photographic paper
- Glass plate, 8 X 10"
- Developer
- Stop bath

— Continued —

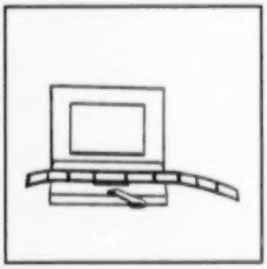
TOOLS AND MATERIALS

- Fixer
- Sink with running water
- Pans for chemicals (3)
- Tongs (3)
- Masking frame
- Black card, 8 X 10"
- Timer

PROCEDURE

FOLLOW THESE STEPS:

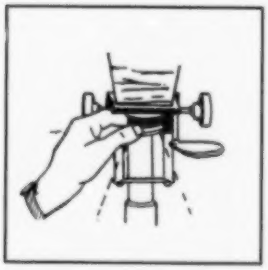
STEP 1: Take the negative you selected and place it in the negative carrier in the enlarger with the shiny side down. Close the carrier and slide it into the enlarger.

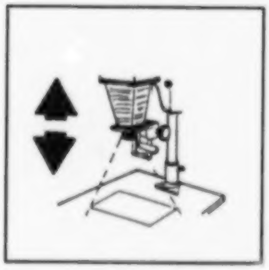


STEP 2: Turn off the darkroom light and turn on the safe light. Turn on the enlarger light.

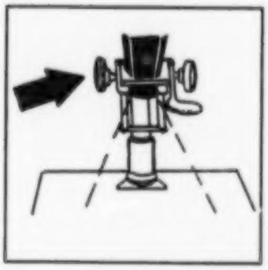
FOLLOW THESE STEPS:

STEP 3: The enlarger has an aperture control similar to a camera's. Open the aperture wide and move the enlarger up and down until the block of light is the size you want your finished print to be. Frame the block of light with the masking frame.



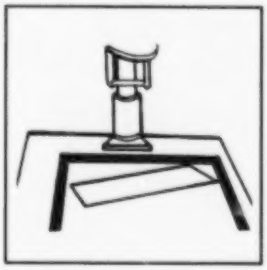


STEP 4: Use the focus control on the enlarger to focus the image on the baseboard. Turn off the enlarger light.

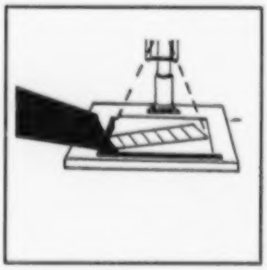


FOLLOW THESE STEPS:

STEP 5: Put a strip of photographic paper across the baseboard.



STEP 6: Cover about 4/5 of the paper with the black card and turn on the enlarger light for exactly five seconds, then turn it off.

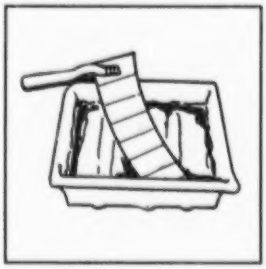


STEP 7: Move the card back so it covers 3/5 of the paper and turn on the enlarger for another five seconds, then turn it off.

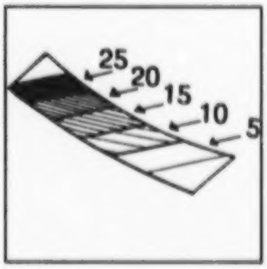
STEP 8: Repeat step 7 three more times, moving the card back 1/5 of the paper each time.

FOLLOW THESE STEPS:

STEP 9: Remove the paper and develop it as you learned earlier. Do not change any of the settings on the enlarger.



STEP 10: After the print has rinsed a few minutes, turn on the darkroom light and decide which section of the print looks the best. Details should show clearly, and there should be a clear contrast between light and dark. Count by fives starting at the lightest strip (5 seconds) to see how many seconds the best section was exposed.



FOLLOW THESE STEPS:

STEP 11: When you finish, clean work area and return equipment and materials to their proper storage areas.

If you complete Day 5 Activities with time left over, you may begin Day 6 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 6 you should complete the following activities:

❶ Complete Objective 8

❷ Complete Objective 9

DAY 6 ACTIVITIES

SUMMARY OF ACTIVITIES

- ♦ Transfer training to new situations
- ♦ Create a finished product

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 6 ACTIVITIES

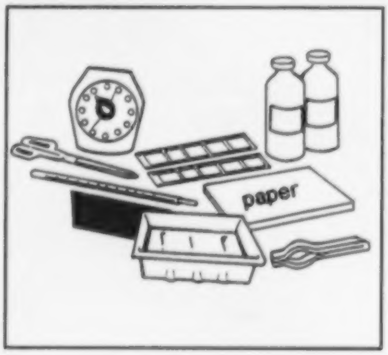
OBJECTIVE 8

Print a photograph using the exposure time determined by the test strip.

INTRODUCTION

In this activity you will print the photograph you selected, using the exposure time you thought looked the best according to the test strip.

TOOLS AND MATERIALS



- Negatives
- Scissors
- Plastic negative carrier
- Darkroom with enlarger
- Thermometer
- Photographic paper
- Glass plate, 8 X 10"

— Continued —

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 6 ACTIVITIES

TOOLS AND MATERIALS

- Developer
- Stop bath
- Fixer
- Sink with running water
- Pans for chemicals (3)
- Tongs (3)
- Masking frame
- Black card, 8 X 10"
- Timer

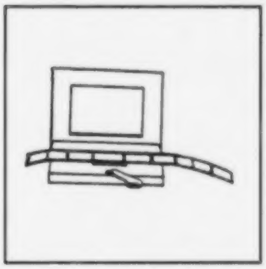
TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 6 ACTIVITIES

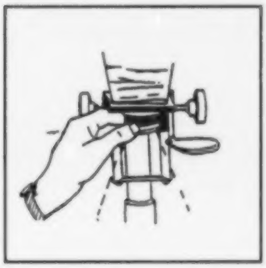
FOLLOW THESE STEPS:

PROCEDURE

STEP 1: Place the negative in the negative holder in the enlarger, using the settings you used for the test strip.



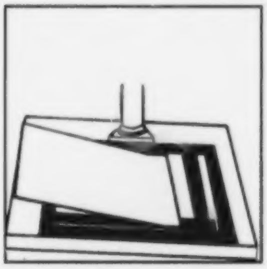
STEP 2: Turn off the darkroom light and turn on the safe light. Turn on the enlarger light.



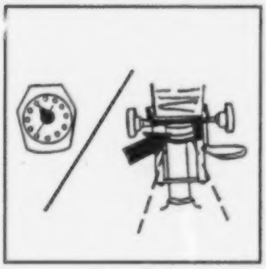
STEP 3: Frame the block of light with the masking frame and turn off the enlarger light.

FOLLOW THESE STEPS:

STEP 4: Put a piece of photographic paper in the area framed by the masking frame.



STEP 5: Turn on the enlarger light for the same number of seconds that the best part of the test strip was exposed. Turn off the enlarger light.



STEP 6: Remove the paper and develop it as you learned earlier. After the prints rinse for approximately 25 minutes, remove them from the sink and place the prints face up on a newspaper or in a print dryer to dry.

While the prints are rinsing and drying, continue Day 6 Activities with Objective 9.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 6 ACTIVITIES

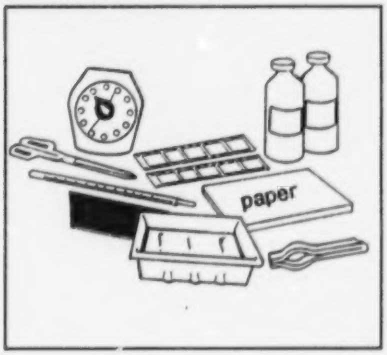
OBJECTIVE 9

Use a mask to create a special effect with a print, using the same negative used in the last objective.

INTRODUCTION

For this activity you will print the same photograph you printed in the last activity. This time you will use a mask to create an interesting frame-like effect. The mask will prevent light from the enlarger from hitting part of the photographic paper, resulting in a white area around the subject of your photo.

TOOLS AND MATERIALS



- Negative
- Darkroom with enlarger
- Thermometer
- Photographic paper
- Developer

— Continued —

TOOLS AND MATERIALS

- Stop bath
- Fixer
- Sink with running water
- Pans for chemicals (3)
- Tongs (3)
- Masking frame
- Heavy paper, 8 X 10"
- Pencil or pen
- Scissors
- Timer

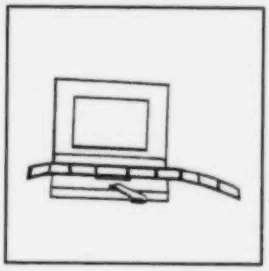
FOLLOW THESE STEPS:

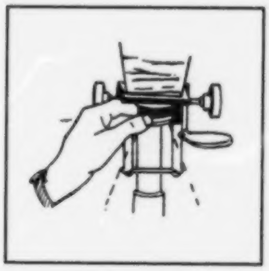
STEP 1: Place the negative in the negative holder in the enlarger with the shiny side down.

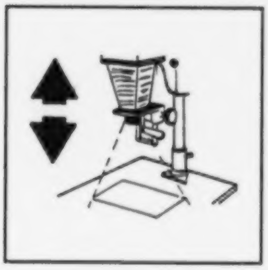
STEP 2: Turn off the darkroom light and turn on the safe light. Turn on the enlarger light.

STEP 3: Open the enlarger's aperture wide and move the enlarger up and down until the block of light is the size you want your finished print to be. This should be the same size as the print you made in the previous activity. Frame the block of light with the masking frame.

PROCEDURE





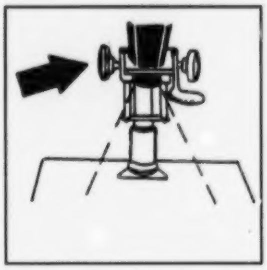


TECHNOLOGY EDUCATION PHOTOGRAPHY

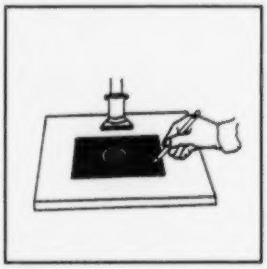
DAY 6 ACTIVITIES

FOLLOW THESE STEPS:

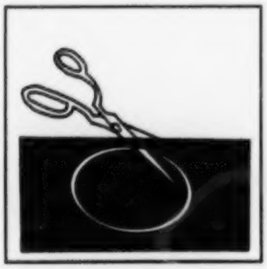
STEP 4: Use the focus control on the enlarger to focus the image on the baseboard.



STEP 5: Put the piece of heavy paper in the area framed by the masking frame. Draw a shape around the subject of the photo. This can be a simple shape, such as an oval, or you could do something more unusual. Use your own imagination. The area outside your shape will be white on the print.



STEP 6: Use the scissors to cut out your frame, making sure the outside edges of the paper stay intact.

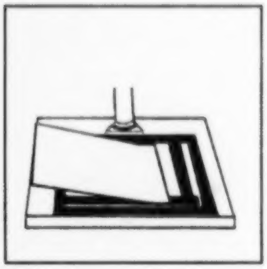


TECHNOLOGY EDUCATION PHOTOGRAPHY

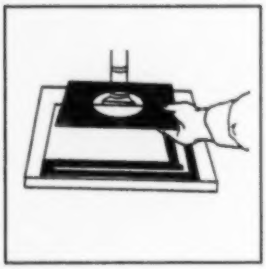
DAY 6 ACTIVITIES

FOLLOW THESE STEPS:

STEP 7: Turn off the enlarger light. If you turned the darkroom lights on to cut out your frame, turn them off now and turn on the safe light. Put a piece of photographic paper on the enlarger baseboard in the area inside by the masking frame.



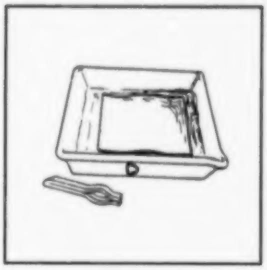
STEP 8: If you want the inside edges of your "frame" to be slightly fuzzy, hold the heavy paper an inch or so above the photographic paper. If you want the edges to be sharp, lay the heavy paper on top of the photographic paper. Turn on the enlarger light for the **same number of seconds** that the best part of the test strip was exposed in the previous activity. If you are holding the heavy paper above the photographic paper, wiggle it very slightly while the enlarger light is on. Turn off the enlarger light.



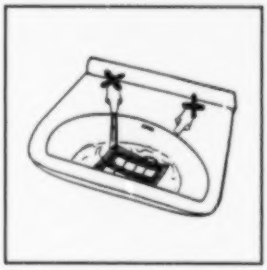
CAUTION
POISONING OR INJURY POSSIBLE.
Do not swallow chemicals or splash into eyes.

FOLLOW THESE STEPS:

STEP 9: Remove the paper and develop it as you learned earlier.



STEP 10: After the print rinses for approximately 25 minutes, remove it from the sink and place the print face up on a newspaper or in a print dryer to dry.



FOLLOW THESE STEPS:

STEP 11: When you finish, clean work area and return equipment and materials to their proper storage areas.

If you complete Day 6 Activities with time left over, you may begin Day 7 Activities.

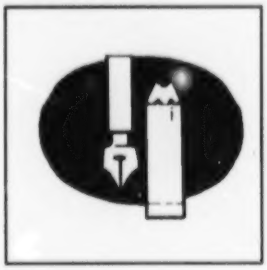
TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 7 you should complete the following activities:

❶ Complete Objective 10

DAY 7 ACTIVITIES

SUMMARY OF ACTIVITIES



Language Skills:
- ♦ Use correct grammar
- ♦ Use correct spelling
- ♦ Use correct punctuation
- ♦ Use correct capitalization

Composition Skills:
- ♦ Use complete sentences

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 7 ACTIVITIES

OBJECTIVE 10

Write a one-page essay, using correct grammar and spelling, describing the process of shooting, developing, and printing your photographs.

INTRODUCTION

For this activity you will write a short essay describing what you did in this TLA. Explain how you took the pictures (if you adjusted the camera settings manually, tell what settings you used and how you chose them), how you developed the negatives, how you decided which one to print, and the process of printing the photograph.

TOOLS AND MATERIALS

- Paper, 8.5 X 11"
- Pen or pencil

PROCEDURE

FOLLOW THESE STEPS:

STEP 1: Write a one-page essay, using correct grammar and spelling, describing what you did in this TLA. Remember to cover all points mentioned in the introduction, along with anything else you want to add.

FOLLOW THESE STEPS:

STEP 2: When you finish, clean work area and return equipment and materials to their proper storage areas.

If you complete Day 7 Activities with time left over, you may begin Day 8 Activities.

TECHNOLOGY EDUCATION PHOTOGRAPHY

On Day 8 you should complete the following activities:

1. Read Impact Statements
2. Complete Career Search Activity
3. Complete any unfinished assignments
4. Complete Posttest.

DAY 8 ACTIVITIES

SUMMARY OF ACTIVITIES

Reading Comprehension Skills:
- Gain factual information
- React to written material

Functional Reading Skills:
- Follow written instructions

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 8 ACTIVITIES

Photography and the environment have always been closely linked. The first photographs were often nature scenes, since the required exposure time was too long for a human subject to remain still.

Nature scenes are still popular subjects for professional and amateur photographers. Many parks and nature reserves post signs telling visitors to "Take only pictures and leave only footprints." A new, more environmentally-sound version of the safari allows people to track down wild animals and shoot them with cameras, not guns. Photography allows people to collect souvenirs or "trophies" without damaging the environment.

Through photographs, people can witness scenes and events that time or distance prevent them from seeing in person. We can see a relative's new baby who was born a thousand miles away, a great-grandparent who died when we were very young, or the grassy field that our neighborhood replaced. We can share in moments from other peoples' lives, such as man landing on the moon or the return of the hostages from the Middle East. We can also witness horrors such as the Holocaust victims of World War II or the people suffering through famine and drought. Many people might have found these events hard to believe if they had not seen them "with their own eyes," through photography.

ENVIRONMENTAL IMPACT

SOCIAL IMPACT

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 8 ACTIVITIES

Like many kinds of technology, photographic equipment has gotten more and more affordable. Today, you can purchase a simple camera for under $40. As cameras became available to the general public, the photography industry grew. People needed places to buy cameras and film and to get their photographs developed and printed. New technology and a steady stream of customers have led to such innovations as one-hour photo processing, disposable cameras, and automatic cameras that allow amateur photographers to achieve almost professional results.

Many of photography's social implications also have a political impact. For example, people who were excited by actually seeing a man walk on the moon might be more willing to spend tax money on space exploration. People are often inspired to demand action by their representatives after seeing photos of people in danger or despair in the United States and other countries. And more than one influential person has seen their career damaged or destroyed by a picture taken at the wrong moment.

ECONOMIC IMPACT

POLITICAL IMPACT

TECHNOLOGY EDUCATION PHOTOGRAPHY

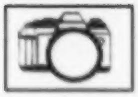
DAY 8 ACTIVITIES

ERGONOMIC IMPACT

Ergonomics means developing products and systems that are comfortable for people to use and that really fit their needs. Photography is involved in this area in two ways. First, there is the ergonomics of photography and cameras. A camera has to be the right size to fit in most users' hands, with the buttons within easy reach. Second, photography is involved in determining the ergonomics of other products and designs. Photographs are very useful in evaluating objects and processes.

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 8 ACTIVITIES



CAREER SEARCH ACTIVITY

INSTRUCTIONS

Using *Career Search Abstracts*, find the occupations listed below. Select the two occupations that sound most appealing to you. On a separate sheet of notebook paper, list the two occupations you selected and tell why. Remember to use complete sentences, proper grammar, and correct spelling. Give the sheets to your instructor.

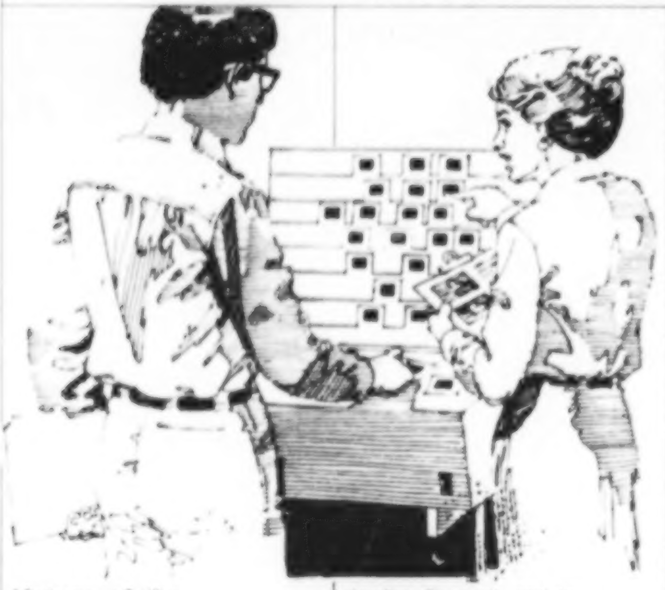
RELATED CAREERS

- ➢ Photo Laboratory Worker
- ➢ Photographer and Camera Operator
- ➢ Commercial Artist

PHOTOGRAPHY CAREER SEARCH ABSTRACTS

DAY 8 ACTIVITIES

PHOTO LABORATORY WORKER



Nature of the Occupation

Photo laboratory workers, also known as developers or darkroom technicians, develop film and print and enlarge pictures.

Duties may include but are not limited to the following:

- Developing film in solutions by hand or directing the operation of automatic equipment
- Testing and maintaining solution strength in developing tanks
- Controlling the exposure of the picture to obtain desired effects specified by the photographer
- Retouching negatives and prints.

Occupation Specialties

(Dot codes in parenthesis)

Automatic Print Developers (976.685-026) tend one or more machines which automatically develop, fix, wash, and dry photographic prints.

Automatic Mounters (976.685-022) operate machines that cut, insert, and seal slide film into cardboards or plastic mounts.

Working Conditions

Photo laboratory workers may assist experienced photographers. In most photo labs, they supervise beginners who do special assignments requiring only a limited knowledge of developing and printing.

Darkroom technicians must spend some of their time working in total darkness. Attention to detail is important and the work can be hectic. Some workers are subject to eye fatigue from inspecting negatives and prints. Those who work in developing are exposed to contact with various chemicals and their odors.

The majority of photo lab employees work a 40-hour week. In commercial labs and photographic studios, frequent overtime may be required.

Tools, Equipment and Materials used may include:

- Various Solutions
- Dyes
- Cleaning Agents
- Glue & Gummed Labels
- Printing Machines
- Processing Machines
- Sensitometers
- Viewing Screens
- Trays
- Drying Cabinets
- Sponges & Squeegees

Worker Requirements

You should like:

- Working with special equipment, processes, and techniques

You should be able to:

- Follow written procedures and instructions
- Record and maintain daily records
- See important detail in pictures and continuously perform the same work
- Count and check numbers accurately
- Make decisions based on personal judgment and/or measurable information

Physically you must:

- Have good eyesight and color vision, either naturally or with correction
- Have full use of arms, hands and fingers
- Tolerate odors and fumes

Opportunities for Experience:

All branches of the military offer opportunities for experience in

OCCUPATION SPECIALTIES

DOT CODE:

976.685-026	Print Developer, Automatic
976.685-022	Mounter, Automatic

SOC CODE: 7671

PHOTO LABORATORY WORKER

photo processing work. Temporary work is usually available in labs during the summer or for several weeks after Christmas.

Methods of Entry:
To enter photo process work, apply directly to an employer. The Photo Marketing Association International may also furnish names of employers. And newspaper want ads frequently list job openings.

Earnings and Advancement

The earnings of photo laboratory workers depend on employer, geographic location, level of skill required, and the type and amount of the worker's responsibility.

Earnings:
Median earnings for full-time photo process workers in 1990 were about $287 a week or $14,908 per year. The middle 50 percent earned between $216 and $417 a week. The lowest 10 percent earned less than $185 a week, while the highest 10 percent earned more than $547.

Fringe Benefits:
Photo laboratory workers may receive life and hospitalization insurance; paid holidays and vacations; and retirement plans. These benefits are usually paid for, at least in part, by the employer.

Career Ladder for this Occupation may look like this:

- Supervisor or Manager
- Photo Laboratory Worker
- Specialist
- Helper

Advancements will depend on experience and performance, and education may be helpful in supervisory positions.

Employment and Outlook

There were approximately 67,000 photo laboratory workers employed nationally in 1988. Employment is expected to grow faster than the average through the year 2000. Increased demand will create some jobs, but most openings will result from replacement needs. Job prospects for photo lab workers are associated to some extent with fluctuations in the business cycle. Employment of photographic lab workers is expected to keep pace with the demand for film processing, despite the growing popularity of self-processing instant cameras and the automation of some photo lab operations.

Photo laboratory workers held about 438 jobs in Oklahoma during 1986. That number is expected to decrease to 436 by 1992, which represents a -1.13 percent change. Job openings each year for photo laboratory workers will equal approximately 9, with 9 of those due to replacements and 0 created through new jobs.

Related Education and Training

Level(s) of education and training usually needed for this occupation:

- On-the-job training
- High school diploma or G.E.D.

Level(s) of education and training also available for this occupation:

- Technical junior or community college

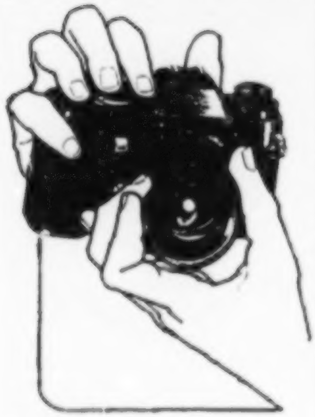
School subjects helpful in preparing for this occupation include:

- Art
- General Math
- Graphic Arts
- Photography
- Chemistry

More Sources of Information

- Photo Marketing Association International
  3000 Picture Place
  Jackson, MI 49201
- Professional Photographers of America
  1090 Executive Way
  Des Plaines, IL 60018
- American Photographic Artisans Guild
  637 S. Shore Drive
  Madison, WI 53715
- Military Service Recruiters

PHOTOGRAPHER & CAMERA OPERATOR



Nature of the Occupation

Photographers and camera operators use cameras and film to photograph or film people, places, and events. In order to visually record ideas and events they need a thorough understanding of camera operation, lighting, composition, darkroom procedures, and the special characteristics of film and papers. Photographers may specialize in portraits, advertising, or other distinct photography. Camera operators film news events, television shows, movies, commercials, and cartoons.

Duties may include but are not limited to the following:

- Carefully arranging lighting and composition of the picture
- Using makeup, lights, reflectors, screens, and props
- Mixing and developing chemicals
- Developing and printing film
- Enlarging, reducing, and retouching prints

Occupation Specialties

(Dot codes in parenthesis)

Still Photographers (143.062.030) photograph subjects using still cameras, color or black-and-white film, and a variety of photographic accessories. They may specialize in a particular type of photography such as illustrative, portrait, fashion, commercial, or architectural and be designated accordingly.

Photojournalists (143.062-034) photograph newsworthy events, locations, people, or other materials for use in publications or telecasts. They usually specialize in one phase of photography such as news, sports, or special features.

Motion Picture Photographers (143.062-022) use their knowledge of motion picture techniques to photograph various subjects and subject matter for use in television productions, movies, promotional and training films, or scientific and medical films.

Aerial Photographers (143.062-014) photograph segments of earth from aircraft to produce pictures used in surveying, mapping, archaeology, volumetric surveying, recording the effects of pollution or natural disasters, determining the condition of crops or timberland, and planning cities and other large-scale projects.

Scientific Photographers (143.062-026) photograph a variety of subject matter to illustrate or record scientific phenomena or data.

Animation Camera Operators (143.382-010) operate special cameras to make animated cartoon motion picture films.

Working Conditions

Photographers may work alone or with an assistant. Most work inside under pleasant conditions, while others work outside and are required to handle heavy and bulky equipment. Sometimes their work can be physically demanding.

Salaried photographers generally work a standard 5-day, 40-hour week and receive time and a half for overtime. Freelance photographers usually work longer hours, including evenings and weekends. Photojournalists may be called to cover an event whenever it occurs. Freelance, news, and commercial photographers travel frequently and may work in uncomfortable surroundings. Sometimes the work can be dangerous, especially for photojournalists assigned to cover stories on natural disasters and armed conflicts.

Many photographers work under pressure. Deadlines and demanding customers must be satisfied.

Photographers usually own several cameras and lenses. Some develop and print their own photographs; others send their work to photographic laboratories for printing.

Photojournalists are usually members of The Newspaper Guild. Members usually pay dues.

Tools, Equipment and Materials used may include:

- Cameras
- Film
- Enlargers & Automated Printers
- Lenses & Colored Filters
- Electronic Flash Units, Floodlights, Reflectors & Tripods

OCCUPATION SPECIALTIES

DOT CODE:

143.382-010	Camera Operator, Animation	143.062-030	Photographer, Still
143.062-014	Photographer, Aerial	143.062-022	Photographer, Motion Picture
143.062-026	Photographer, Scientific	143.062-034	Photojournalist

SOC CODE: 326

PHOTOGRAPHER & CAMERA OPERATOR

Worker Requirements

You should like:
- Communicating information to others

You should be able to:
- See detail and differences in shapes and shadings
- Work within precise limits or standards of accuracy
- Have a feeling for form and symmetry
- Use your imagination and be original in your thinking

Physically you must:
- Talk, hear and see well, either naturally or with correction, including color vision
- Have good manual dexterity and hand-eye coordination
- Reach for, handle, and feel things

Opportunities for Experience:

Photography as a hobby, work on the school yearbook, and the military services offer opportunities for experience in this field. Experience is also available through participation in a formal apprenticeship program.

Methods of Entry:

Methods of entering this occupation include applying directly to employers and photographic supply houses and completing an apprenticeship program. Positions may be located by consulting professional associations and unions, school and college placement offices, newspaper want ads and state employment offices.

Earnings and Advancement

Earnings are determined by assignments and locations of work. Although freelance and self-employed photographers may earn more than salaried workers, their earnings are greatly affected by business conditions and their community.

Earnings:

Nationally, in 1990, photographers and camera operators employed in private industry earned salaries ranging from $26,736 to $36,735, depending upon the difficulty of work performed.

Photographers working for daily newspapers under contracts negotiated with The Newspaper Guild earned starting salaries of $419 per week in 1990. The middle 50 percent of beginners earned from $399 to $495. Fully experienced photographers earned a median weekly salary of $662. The middle 50 percent of these contracts fell between $563 and $751 per week.

Photographers employed by the Federal Government earned an average yearly salary of $27,768 in 1990. Some freelance and self-employed photographers earn more than salaried workers. Many do not. Their earnings are affected by the hours they work, the quality of their product, their marketing ability, business climate, location, and clientele.

Fringe Benefits:

Depending on the employer, photographers may receive paid vacations and holidays; life, accident, disability, and hospitalization insurance; retirement plans; and sick pay. These benefits are usually paid for, at least in part, by the employer. Freelance photographers and self-employed studio photographers must provide their own fringe benefits.

Most employers strongly prefer hiring individuals with two or more years of college training and courses in photography.

Employment and Outlook

There were approximately 105,000 photographers and camera operators employed nationally in 1988. Employment is expected to grow at a faster than average rate through the year 2000. Employment of commercial photographers is expected to grow rapidly to meet the increased need for visual images in business, education, and entertainment. Scientific and medical research photography offers excellent employment opportunities. As the entertainment industry expands, jobs for movie and video camera operators should also grow, but competition will remain intense for such jobs.

Photographers and camera operators held about 870 jobs in Oklahoma during 1986. That number is expected to increase to 924 by 1992, which represents a 6.32 percent change. Job openings each year for photographers and camera operators will equal approximately 31, with 22 of those due to replacements and 9 created through new jobs.

Related Education and Training

Level(s) of education and training usually needed for this occupation:
- On-the-job training
- Technical junior or community college
- Apprenticeship

Level(s) of education and training also available for this occupation:
- Less than a high school diploma
- College bachelor's degree

School subjects helpful in preparing for this occupation include:
- Art
- General Math
- Photography
- Chemistry

More Sources of Information

- Professional Photographers of America
  1090 Executive Way
  Des Plaines, IL 60018

COMMERCIAL ARTIST

Nature of the Occupation

Commercial or graphic artists apply their skills and artistic vision to a variety of media to produce art that serves a client's needs. They create artwork to illustrate or promote products, services, and ideas, as well as artwork used primarily to improve appearance or attract attention. They plan, design, and draw illustrations for various media, such as billboards, brochures, catalogs, books, magazines, newspapers, television, and packaging.

Duties may include but are not limited to the following:

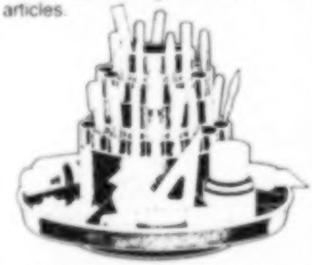
- Confer with clients to plan design and determine budget, presentation approaches, and styles
- Assign and direct staff members to develop design concepts
- Examine designs, sketches, or illustrations
- Determine nature, size, and arrangement of materials
- Select best techniques to produce desired effect
- Produce samples for client approval
- Direct and instruct photographers or illustrators in execution of design concepts
- Inspect and review final production and suggest any needed improvements
- Present production to clients for approval

Occupation Specialties

(Dot codes in parenthesis)

Art Directors (141.031-010) formulate concepts and supervise workers engaged in executing layout designs for artwork and copy to be presented by such visual communication media as magazines, books, newspapers, television, posters, and packaging.

Cartoonists (141.061-010) draw comic or editorial cartoon and comic strips to amuse readers and illustrate or comment upon news events, advertising, stories, or articles.



Graphic Designers (141.061-018) design art and copy layouts for material to be presented by such visual communication media as books, magazines, newspapers, television, packaging, and advertising.

Illustrators (141.061-022) draw or paint illustrations for use by various media to explain or adorn the printed or spoken word.

Medical and Scientific Illustrators (141.061-026) make sketches and construct 3-dimensional models to illustrate surgical and medical research procedures, anatomical and pathological specimens, clinical disorders, micro-organisms, and plant and animal tissue.

Working Conditions

Commercial artists may work alone or in a team with the art director giving general supervision. Many illustrators are freelance artists who service regular accounts along with new or one-time customers.

Working conditions may vary by the type of artwork and the employer. Generally, commercial artists work in clean, well-lighted, temperature-controlled areas in office buildings, department stores, art studios, advertising agencies, or printing or industrial plants. Medical and scientific illustrators frequently spend time in operating rooms observing and sketching surgical procedures or in laboratories containing specimens and equipment that they use to prepare drawings. Commercial artists may spend much of their time standing or sitting at a drawing board or work table.

Salaried commercial artists usually work 35 to 40 hours a week. Employers generally provide all supplies and equipment. Commercial artists may be required to work irregular hours or overtime during emergencies and to meet deadlines. However, many jobs in this field can lead to free-lancing or to flexible hours.

Worker Requirements

You should like:

- Activities concerned with communicating ideas to people
- Activities which require creative imagination
- Activities bringing satisfaction from seeing your work in print

You should be able to:

- Reason logically and create new ideas
- Understand the meaning of words and use language effectively
- Make decisions based on personal judgment
- Interpret feelings, ideas, or facts artistically
- Accept criticism of your work
- Influence people's opinions, attitudes, or judgments
- Understand the 2-dimensional representation of objects

OCCUPATION SPECIALTIES

DOT CODES:

141.031-010	Art Director
141.061-010	Cartoonist
141.061-018	Graphic Designer
141.061-022	Illustrator
141.061-026	Medical And Scientific Illustrator

SOC CODE: 322, 325

COMMERCIAL ARTIST

- Perceive details in objects or drawings and see differences in their shapes or shadings.
- Coordinate and plan entire activities, if an art director
- Move your fingers and handle small objects accurately

Physically you must:
- Use your hands and fingers fully
- Coordinate the movements of eyes and hands or fingers
- See well, naturally or with correction, and distinguish colors
- Talk and hear, if an art director or a graphic designer

Special Requirements:
Most employers prefer 4-year art school graduates with technical and commercial skills. Graphic arts applicants should demonstrate talent, training, and experience. Artists in scientific and medical illustration need specialized training.

Opportunities for Experience:
Related postsecondary programs may offer experience. Consider working on the school yearbook, newspaper, stage sets, bulletin boards, or posters as experience. For more experience, create posters, layouts, or illustrations for church and community groups. Part-time or summer jobs in commercial art studios or military service may help.

Earnings and Advancement

Commercial artists' earnings depend on skill, education, type of artwork, geographic area, and type and size of employer. Earnings of a free-lance commercial artist may vary with the artist's individual fees and reputation, as well as the nature and amount of artwork sold.

Earnings:
Nationally, in 1990, fine artists and commercial artists who usually worked full time earned median salaries of about $21,733 per year. The middle 50 percent earned between $16,303 and $30,431 per year. The top 10 percent earned more than $40,213. The bottom 10 percent earned less than $13,042 per year.

Inexperienced illustrators employed by the Federal Government started at the GS-5 level with annual earnings in 1990 of $16,305. They may advance to the GS-12 level with a salary of $35,825.

Career Ladder for this Occupation may look like this:
- Art Director
- Illustrator
- Trainee

Beginning commercial artists usually need on-the-job training and are assigned routine work. Advancement depends on individual talent, creativity, and education. Experienced commercial artists may eventually become art directors, if they have managerial ability, or open their own studios.

Employment and Outlook

Nationally, there were approximately 216,000 fine artists and commercial artists employed in 1988. Employment is expected to grow faster than the average for all occupations through 2000 as the areas of advertising and design continue to expand with the economy. Commercial artists with average ability and little specialized training are expected to encounter keen competition for beginning jobs and have limited advancement opportunities.

The demand for commercial artists may vary according to specialization or type. The demand for free-lance artists is expected to increase, while jobs for art directors and graphic designers will be fewer and open only to experienced, highly talented, and creative artists. One area of growth is in visual advertising such as television graphics, packaging displays, and poster and window displays. Another is industrial design which is expected to require more qualified artists to do 3-dimensional work with engineering concepts.

Commercial artists held about 1,125 jobs in Oklahoma during 1986. That number is expected to increase to 1,173 by 1992 which represents a 4.44 percent change. Job openings each year for commercial artists will equal approximately 38, with 30 of those due to replacements and 8 created through new jobs.

Related Education and Training

Level(s) of education and training usually needed for this occupation:
- On-the-job training
- Technical junior or community college
- College bachelor's degree

School subjects helpful in preparing for this occupation include:
- College Preparatory
- Crafts
- Custodial Service
- Arts
- Photography
- Graphic Arts

More Sources of Information

- National Association of Schools of Art and Design
  11250 Roger Bacon Dr., #5
  Reston, VA 22090

- The Society of Illustrators
  128 East 63rd Street
  New York, NY 10021

- Association of Medical Illustrators
  2692 Huguenot Springs Road
  Midlothian, VA 23113

- The Graphic Artists Guild
  11 West 20th Street
  New York, NY 10011

TECHNOLOGY EDUCATION PHOTOGRAPHY

DAY 8 ACTIVITIES

POSTTEST

INSTRUCTIONS

You will need a computer scan sheet or card to record your answers to the following Posttest. Be sure to write your name, the title of the TLA, the date, and the class period on the computer scan sheet or card using a #2 pencil. Use rows 16-25 to record the answers to the Posttest. If your answers will be hand-scored, use a blank sheet of notebook paper to record your answers and number your answers 16-25.

SPELLING TEST INSTRUCTIONS

Use rows 26-35 on the test card. If the word is spelled correctly, mark (a) on the computer score sheet or card. If the word is spelled incorrectly, mark (b) on the test card. Be sure to use a #2 pencil and make your marks dark. If your answers will be hand-scored, use a blank sheet of notebook paper to record your answers and number your answers 26-35.

Get Posttest Questions from your Instructor.

When you finish the Posttest, return the test form and the computer scan card or notebook paper to your instructor.

If you complete Day 8 Activities with time left over, you may complete a Skunk Works Activity.

TECHNOLOGY EDUCATION PHOTOGRAPHY

SKUNK WORKS

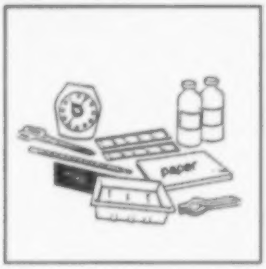
BACKGROUND

The term *Skunk Works* comes from an engineering division of the 3M Company. In the late 1960s, a group of engineers at 3M wanted to design a new product, but the managers of the company would not give them the money for research. So they decided to design the product anyway, then try to convince the company to market it. Whenever the engineers could grab a few extra minutes from their regular assignments, they worked on the new product. In early 1969 they presented it to the marketing division of 3M, and the company has been selling it ever since. The product: Velcro fasteners.

SKUNK WORKS CHALLENGE

In this activity you will create a photograph with two separate negatives printed together. Choose two negatives that will go together well — if one is cluttered, the other should be relatively simple. The amount of time the print will need to spend in each chemical depends on the type of chemical and paper used. Ask your instructor how long to use each chemical and what to do with the used chemicals.

TOOLS AND MATERIALS



- Negatives
- Darkroom with enlarger
- Thermometer
- Photographic paper
- Developer
- Stop bath
- Fixer
- Sink with running water
- Pans for chemicals (3)
- Tongs (3)
- Masking frame
- Timer

TECHNOLOGY EDUCATION PHOTOGRAPHY

SKUNK WORKS

PROCEDURE

FOLLOW THESE STEPS:

STEP 1: Put the two negatives in the negative holder, shiny side down. Slide the negative carrier into the enlarger.

CAUTION

POISONING OR INJURY POSSIBLE. Do not swallow chemicals or splash them in eyes.

STEP 2: In the darkroom, pour the chemicals into the pans and arrange them in the following order (left to right): developer, stop bath, fixer. Check the temperature of all chemicals and adjust, if necessary, by putting the containers into a larger container of warm or cold water. The correct temperature is approximately 68° F. Put one set of tongs in each pan of chemicals.

STEP 3: Turn off the darkroom light and turn on the safe light. Turn on the enlarger light.

FOLLOW THESE STEPS:

STEP 4: Open the aperture wide and move the enlarger up and down until the block of light is the size you want your finished print to be. Frame the block of light with the masking frame.

STEP 5: Use the focus control on the enlarger to focus the image on the baseboard. Turn off the enlarger light.

STEP 6: Put a strip of photographic paper across the baseboard.

STEP 7: Cover about 4/5 of the paper with the black card and turn on the enlarger light for exactly 15 seconds, then turn it off (you start with 15 seconds instead of five because this print will need the light for about three times as long as a print with only one negative).

STEP 8: Move the card back so it covers 3/5 of the paper and turn on the enlarger for ten seconds, then turn it off.

STEP 9: Repeat step 8 three more times, moving the card back 1/5 of the paper each time.

FOLLOW THESE STEPS:

STEP 10: Remove the paper. Do not change any of the settings on the enlarger.

STEP 11: Take the exposed paper and slide it into the pan of developer, shiny side down. Carefully rock the pan and then turn the paper over with the tongs. When the image is clear, pick up the print with tongs and let it drip for a few seconds. Leaving the print in the developer too long will cause it to turn dark.

STEP 12: Slide the print into the pan of stop bath **without letting the tongs touch the stop bath. Put the developer tongs back in the pan of developer.** Carefully rock the pan for the correct amount of time. Use the tongs to pick up the print and let it drip for a few seconds.

STEP 13: Slide the print into the pan of fixer **without letting the tongs touch the fixer. Put the stop bath tongs back in the pan of stop bath.** Carefully rock the pan for the correct amount of time.

FOLLOW THESE STEPS:

STEP 14: It is safe to turn on the darkroom light now. Put the print in the sink or a print washer and rinse it with running water. After the print has rinsed a few minutes, remove it from the water and decide which section of the print looks the best. Details should show clearly, and there should be a clear contrast between light and dark. Count by tens starting at the lightest strip (15 seconds) to see how many seconds the best section was exposed. You do not have to turn in this test strip.

STEP 15: The negatives should be in the negative holder in the enlarger as you left it, with all settings the same.

STEP 16: Turn off the darkroom light and turn on the safe light. Turn on the enlarger light.

STEP 17: Frame the block of light with the masking frame and turn off the enlarger light.

FOLLOW THESE STEPS:

STEP 18: Put a piece of photographic paper in the area framed by the masking frame.

STEP 19: Turn on the enlarger light for the **same number of seconds** that the best part of the test strip was exposed. Turn off the enlarger light.

STEP 20: Remove the paper and develop it as you developed the test strip. After the print has rinsed for approximately 25 minutes, remove it from the sink and place it face up on a newspaper or in a print dryer to dry.

STEP 21: When you finish, clean work area and return equipment and materials to their proper storage areas.

158

OKLAHOMA
TSA